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PAPERS AND PROCEEDINGS

OF THE

Seventy-fourth Annual Meeting

OF THE

AMERICAN ECONOMIC ASSOCIATION

New York, New York, December 27-29, 1961

45

Edited by the Secretary of the Association

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THE AMERICAN
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VOL. LII MAY, 1962 NUMBER 2

PAPERS AND PROCEEDINGS

OF THE

Seventy-fourth Annual Meeting

OF THE

AMERICAN ECONOMIC ASSOCIATION

New York, New York, December 27-29, 1961

Edited by JAMES WASHINGTON BELL, *Emeritus Secretary of the Association*
and
GERTRUDE TAIT, *Executive Assistant*

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PROGRAM OF THE SEVENTY-FOURTH ANNUAL MEETING OF THE AMERICAN ECONOMIC ASSOCIATION

New York, New York, December 27-29, 1961

The program is not organized around a central theme. The subjects covered are diverse and reliance is placed on the session headings and the titles of papers to give an adequate impression of the matters discussed.

Tuesday, December 26, 1961

6:00 P.M.

Executive Committee Dinner

Wednesday, December 27, 1961

9:30 A.M.

International Transmission of Business Cycles: Problems and Policies
Chairman: HAL B. LARY, National Bureau of Economic Research
Papers: MILTON GILBERT, Bank for International Settlements; JACQUES J. POLAK and R. R. RHOMBERG, International Monetary Fund
Discussants: WALTER S. SALANT, Brookings Institution; RICHARD E. CAVES, University of California, Berkeley; EMILE DESPRES, Stanford University

Tax Problems
Chairman: RICHARD A. MUSGRAVE, Princeton University
Papers: RICHARD B. GOODE, Brookings Institution; E. CARY BROWN, Massachusetts Institute of Technology; A. R. PREST,[1] Cambridge University
Discussants: GEORGE F. BREAK, University of California, Berkeley; OTTO ECKSTEIN, Harvard University; MELVIN WHITE, Brooklyn College

Problems of Economic Development
Chairman: THEODORE W. SCHULTZ, University of Chicago
Papers: KENNETH E. BOULDING and PRITAM SINGH, University of Michigan; JOHN H. POWER, Williams College; GUSTAV F. PAPANEK, Harvard University
Discussants: EVERETT E. HAGEN, Massachusetts Institute of Technology; ANDREW M. KAMARCK, International Bank for Reconstruction and Development; FREDERIC C. SHORTER, Princeton University

2:30 P.M.

Soviet Economic Planning
Chairman: EVSEY D. DOMAR, Massachusetts Institute of Technology
Papers: HERBERT S. LEVINE, University of Pennsylvania; LEON SMOLINSKI, Boston College; DAVID GRANICK, University of Wisconsin
Discussants: LLOYD G. REYNOLDS, Yale University; JAMES H. BLACKMAN, University of North Carolina; ALEXANDER ERLICH, Columbia University

Systems of Economic Accounts and Analysis for Urban Regions
Chairman: EDGAR M. HOOVER, Pittsburgh Regional Planning Association
Papers: HARVEY S. PERLOFF, Resources for the Future; WERNER Z. HIRSCH, Washington University; HENRY COHEN, Deputy City Administrator, New York City
Discussants: MEREDITH B. GIVENS, Institute of Public Administration; FREDERICK T. MOORE, RAND Corporation

Rural Poverty and National Policy (Joint session with the American Farm Economic Association)[2]
Chairman: WILLIAM H. NICHOLLS, Vanderbilt University
Papers: LOUIS LEVINE, U.S. Department of Labor; WILLIAM E. HENDRIX, U.S. Department of Agriculture
Discussants: LEONARD P. ADAMS, Cornell University; JOHN G. MCNEELY, Agricultural and Mechanical College of Texas

The New Encyclopedia of the Social Sciences (Joint session with the American Statistical Association)[3]
Chairman: ALVIN S. JOHNSON, New School for Social Research
Papers: FRANCIS X. SUTTON, Ford Foundation; JEREMIAH KAPLAN, Free Press of Glencoe; W. ALLEN WALLIS, University of Chicago

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[1] To be published in the *Econ. J.*
[2] To be published in the May, 1962, *J. of Farm Econ.*
[3] To be published by the American Statistical Association.

8:00 P.M.

Presidential Address[4]

Chairman: Alvin H. Hansen, Harvard University

Address: Paul A. Samuelson, Massachusetts Institute of Technology

Thursday, December 28, 1961

9:00 A.M.

The Role of Transportation in Economic Development

Chairman: Ralph J. Watkins, Brookings Institution

Papers: Hans Heymann, Jr., RAND Corporation; John H. Kaufmann, Washington, D.C.; Wilfred Owen, Brookings Institution

Discussants: Holland Hunter,[5] Haverford College; James R. Nelson, Amherst College

Problems of Persistent Unemployment (Joint session with the Industrial Relations Research Association)[6]

Chairman: Philip Taft, Brown University

Papers: Stanley Lebergott, Bureau of the Budget; William H. Miernyk, Northeastern University; Richard C. Wilcock and Walter H. Franke, University of Illinois

Discussants: George H. Borts, Brown University; John G. Turnbull, University of Minnesota; Robert J. Lampman, University of Wisconsin

9:30 A.M.

Studies in Business Behavior

Chairman: Arthur F. Burns, Columbia University

Papers: Robert Eisner, Northwestern University; Eva Mueller and James N. Morgan, University of Michigan; Arthur M. Okun, Yale University

Discussants: Lawrence Klein,[5] University of Pennsylvania; Daniel H. Brill, Federal Reserve Board

12:30 P.M.

Joint Luncheon with the American Finance Association[7]

Chairman: Arthur M. Weimer, Indiana University

Speaker: Robert V. Roosa, Under Secretary of the Treasury for Monetary Affairs

2:30 P.M.

Economic Behavior of Families

Chairman: Ruth P. Mack, New School for Social Research

Papers: Arthur S. Goldberger and Maw Lin Lee, University of Wisconsin; Guy H. Orcutt, University of Wisconsin

Discussants: Robert Summers, University of Pennsylvania; Daniel B. Suits, University of Michigan; Mona E. Dingle, Federal Reserve Board

2:45 P.M.

The Market for Economists

Chairman: James Washington Bell, Northwestern University

Papers: Ewan Clague, U.S. Department of Labor; Francis M. Boddy, University of Minnesota; Gerald G. Somers, University of Wisconsin

Discussants: Seymour E. Harris, Harvard University; George Cline Smith, MacKay-Shields Associates; Howard D. Marshall, Vassar College

Transportation Problems in the American Economy (Joint session with the American Transportation Research Forum)

Chairman: Ernest W. Williams, Jr., Columbia University

Papers: Maurice P. Arth, Booz, Allen & Hamilton; James C. Nelson, Washington State University; Kent T. Healy, Yale University

Discussants: Merrill J. Roberts, University of Pittsburgh; Dudley F. Pegrum, University of California, Los Angeles

3:00 P.M.

Reappraisal of the Doctrine of Consumer Sovereignty

Chairman: William J. Fellner, Yale University

Papers: Franklin M. Fisher, Massachusetts Institute of Technology, Zvi Griliches,

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[4] Published in the March, 1962, *A.E.R.*

[5] No manuscript received.

[6] To be published by the Industrial Relations Research Association.

[7] Published in the Mar., 1962, *J. of Fin.*

University of Chicago, and Carl Kaysen, Harvard University; Tibor Scitovsky, University of California, Berkeley; Jerome Rothenberg, Northwestern University
Discussants: Abram Bergson, Harvard University; Stanislaw H. Wellisz, University of Chicago; William J. Baumol, Princeton University

8:00 P.M.
Invited Lecture
Chairman: R. A. Gordon, University of California, Berkeley
Paper: Herbert Simon, Carnegie Institute of Technology
Discussants: W. Allen Wallis, University of Chicago; Paul Lazarsfeld, Columbia University; John Lintner, Harvard University

Friday, December 29, 1961
9:00 A.M.
Marketing Strategies and Distribution Systems (Joint session with American Marketing Association)
Chairman: Wendell R. Smith, Radio Corporation of America
Papers: D. J. Bowersox, REA Express; John Magee, Arthur D. Little, Inc.; Robert L. Banks, R. L. Banks and Associates
Discussants: W. J. Baumol, Princeton University; E. W. Smykay, Michigan State University

9:30 A.M.
The Lagging U.S. Growth Rate
Chairman: Solomon Fabricant, National Bureau of Economic Research
Papers: Edward F. Denison, Committee for Economic Development; Robert M. Solow, Massachusetts Institute of Technology
Discussants: Franco Modigliani,[5] Northwestern University; Gerhard Colm, National Planning Association; John Cornwall, Tufts College; Arthur Smithies, Harvard University
The Teaching of Economics
Chairman: Ben W. Lewis, Oberlin College
Papers: Bernard F. Haley, Stanford University; Richard Ruggles, Yale University
Discussants: Royall Brandis, University of Illinois; Kenneth D. Roose, Michigan State University; Carl Stevens, Reed College
Economics of Water Resource Use
Chairman: Robert Dorfman, Harvard University
Papers: Vincent Ostrom, University of California, Los Angeles; George S. Tolley and Cleon Harrell, North Carolina State College
Discussants: Stephen Marglin, Harvard University; Jerome Milliman, Indiana University

2:30 P.M.
Report of the Commission on Money and Credit
Chairman: G. L. Bach, Carnegie Institute of Technology
Papers: Milton Friedman, University of Chicago; Warren L. Smith, University of Michigan; Ralph A. Young, Federal Reserve Board
Discussants: Romney Robinson, Brandeis University; Robert Lindsay, Federal Reserve Bank of New York
The Economics of Research and Development
Chairman: Carl Kaysen, Harvard University
Papers: Jacob Schmookler and Oswald Brownlee, University of Minnesota; W. Eric Gustafson, Harvard University
Discussants: Zvi Griliches, University of Chicago; James W. McKie, Vanderbilt University
Accountants and Economists Look at Depreciation (Panel discussion with American Institute of Certified Public Accountants)
Chairman: Maurice Moonitz, University of California, Berkeley
Panelists: George W. Terborgh, Washington, D.C.; Vernon L. Smith, Purdue University; Walter R. Staub, New York; William W. Werntz, New York

5:00 P.M.
Business Meeting

6:00 P.M.
Executive Committee Dinner Meeting

THE purpose of the American Economic Association, according to its charter, is the encouragement of economic research, the issue of publications on economic subjects, and the encouragement of perfect freedom of economic discussion. The Association as such takes no partisan attitude, nor does it commit its members to any position on practical economic questions. It is the organ of no party, sect, or institution. Persons of all shades of economic opinion are found among its members, and widely different issues are given a hearing in its annual meetings and through its publications. The Association, therefore, assumes no responsibility for the opinions expressed by those who participate in its meetings. Needless to say, the papers presented are the personal opinions of the authors and do not commit the organizations or institutions with which they are associated.

HAROLD F. WILLIAMSON
Secretary

INVITED LECTURE

NEW DEVELOPMENTS IN THE THEORY OF THE FIRM*

By HERBERT A. SIMON
Carnegie Institute of Technology

Economics has often been defined as the study of the allocation of scarce resources. Shubik has observed that the definition is so broad as to fit psychiatry about as well as economics. In spite of his stricture, which is probably right, I shall use this very broad definition to delimit the area of my remarks. I shall have something to say about both the normative aspects—the optimal allocation of resources—and the positive—the processes whereby resources actually are allocated. There are many well-known reasons why neither of these two aspects can easily be discussed without some attention to the other.

Economics and Administration. Economics (or psychiatry, if we accept Shubik's observation) is not the only science that claims an interest in resource allocation. A standard, often quoted definition of public administration reads:[1]

> Public administration is the management of men and materials in the accomplishment of the purposes of the state. . . . The objective of public administration is the most efficient utilization of the resources at the disposal of officials and employees.

If we delete the word "public" and substitute "firm" for "state," we arrive at a statement that could serve very well as a definition of normative microeconomics.

In international law, sweeping territorial claims are only made good by effective occupation. Similarly, definitions set the boundaries of a science only if they spell out the concepts it actually uses, the tools of analysis it has developed, and the knowledge it has attained. When we come to describe economics and administration, respectively, in these more specific terms, we soon see that they occupy very different territories within the general domain of resource allocation.

Mechanisms for Resource Allocation. As a general rule, economics and administration have limited their investigations to particular, and distinct, classes of mechanisms and processes for resource allocation. Economics discovered the institution of the market, the price mechanism as a market-regulating process, and marginal analysis as a means of calculation. Administration discovered the institution of the formal organization, the mechanisms of authority and interpersonal influence to secure co-ordination, and planning as a means of decision making. The business firm became the boundary—I am tempted to say, the no man's land—between economics and administration. In our society—and perhaps even more generally in Western society of the last century—market mechanisms have been largely responsible for allocating resources among firms and among sectors of the economy, while authority and influence mechanisms have been largely responsible for allocating resources within firms.

---

* I have borrowed freely from a forthcoming study, *The Behavioral Theory of the Firm*, by my colleagues Richard W. Cyert and James G. March, and have benefited also from their comments on earlier drafts of this paper.

[1] Leonard D. White, *Introduction to the Study of Public Administration* (Macmillan, 1926), p. 2.

To these two classes of allocative mechanisms we can add two more: democratic political processes and bargaining, which have received some attention in both economics and administration.[2] Viewing these four mechanisms as functional equivalents, all concerned with resource allocation, raises all sorts of possibilities for investigation, and suggests numerous hypotheses, both normative and descriptive, about allocation. It also suggests a possible framework for classifying and interpreting the developments that have been taking place in the theory of the firm.

For example, we may consider explaining allocation in oligopolistic industries by bargaining rather than classical market mechanisms, as Galbraith, Shubik, and others have done. Conversely, we may pursue Anthony Downs's path of interpreting political behavior in terms of a generalized marginal analysis. We may seek parallels between the problems of control over political and administrative leaders by voters in a political democracy, and control over boards of directors and management by stockholders in a corporation. We may examine alternative arrangements for the joint use of prices and administrative controls to allocate resources in a wartime economy; or the consequences of using internal prices and divisional balance sheets to manage large multiproduct corporations.

Much of what is new in the theory of the firm has come from viewing allocation broadly, and from experimenting with the descriptive and normative application of the several allocative mechanisms outside the realms where they were initially discovered and employed.

Prospectus. In my remarks I am going to describe developments in the theory of the firm under two main headings: first, developments arising out of the vigorous activity since the second World War in management science and operations research; second, developments arising out of descriptive, positive research on human behavior in organizations.

---

[2] Robert A. Dahl and Charles E. Lindblom, in *Politics, Economics, and Welfare* (Harper, 1953), organize their analysis of resource allocation in terms of these four major types of processes: the price system, hierarchy (organization), polyarchy (democracy), and bargaining.

In each of these areas of work—management science and organization theory—I shall comment on what the new developments imply (1) for our theoretical models of the business firm, (2) for our understanding of allocative mechanisms, and (3) for techniques of investigating behavior in the business firm.

Finally, I shall take the liberty of adding a brief epilogue to the draft of this paper I sent to my discussants before the meeting—I shall be my own first discussant, as it were. In the epilogue I should like to indicate what consequences the new developments in the theory of the firm are likely to have for economic policy and welfare economics.

Management Science and Operations Research. In sheer quantity, the man-hours that have been devoted to normative microeconomics—under such titles as "managment science," "operations research," and "managerial economics"—outnumber those that have been applied to any other aspect of the theory of the firm in recent decades. Whether this has been an optimal allocation of effort is hard to say. It has certainly been productive. If optimizers are uncertain of its worth, satisficers can be content.

Since a whole session of last year's meetings of this Association was devoted to evaluating managerial economics' contributions to economic theory and vice versa, we need not go over the ground again in detail, but can base our conclusions on that previous discussion. The central fact is very simple: management science has brought economists in contact with the facts of business life, and businessmen in contact with the tools of economic analysis on a large scale, to the mutual advantage and surprise of both.

One of Mr. Wallis' colleagues has written that he already knows what an economist will find when he looks into a business firm, and that even if he finds something quite different it does not matter for economics.[3] He may be right on both counts, but since the looking will continue to go on, for quite practical reasons, we have no need to prejudge the result.

Management scientists are not concerned with systematic surveys of business practice. Their activity has not produced sample data from which one can extrapolate or aggregate a model of the behavior of firms in the economy. We should not underestimate, however, the impact upon economic theory of the anecdotal accounts of business decision making made available to economics by contact with business problems and practice.

---

[3] Milton Friedman, *Essays in Positive Economics,* Chap. 1.

The Role of Information in the Model of the Firm. An example of this impact is the growing attention to search for information and transmission of information as vital steps in the decision-making process. Uncertainty is, of course, a venerable economic variable, but the treatment of reduction of uncertainty as an economic activity is a relatively recent development. As Stigler observes:

> One should hardly have to tell academicians that information is a valuable resource: knowledge is power. And yet it occupies a slum dwelling in the town of economics. Mostly it is ignored: the best technology is assumed to be known; the relationship of commodities to consumer preferences is a datum. And one of the information-producing industries, advertising, is treated with a hostility that economists normally reserve for tariffs or monopolists.[4]

There is no difficulty in tracing this rediscovery of the economic significance of information back to activity in management science and operations research over the past two decades. Without attempting to reconstruct the history, I list some studies that gave information a central role and that are available to the economic theorist who wishes to re-examine the significance of this variable for the theory of the firm. An early example of the use of operations research techniques to solve a military problem was the application, discussed at length in the book of Morse and Kimball, of the theory of search to submarine warfare. Out of this application grew a more general theory of optimal search, developed by B. O. Koopman, Charnes and Cooper, and others.

Contemporaneously, consideration of games of imperfect information within the general framework of the theory of games led Marschak and Radner to develop an economic theory of teams, in which the cost of information and the value of information are the key variables.

Because management scientists became keenly aware of the imperfections of the data with which they worked, they early developed an interest in "sensitivity analysis." Sensitivity analysis is aimed at estimating the costs of making decisions with bad data and, correlatively, at estimating the value of procedures to improve the data. Cooper and Charnes and Dantzig developed techniques of sensitivity analysis as part of the apparatus for applying linear programming to management decisions. Sensitivity analysis and techniques for estimating the costs of inaccurate forecasts were developed for certain classes of dynamic programming models by Holt, Modigliani, Muth, and Simon in the United States and by Theil in the Netherlands. Out of this and similar work came a new understanding of forecast horizons: the degree of independence of current decisions from information about distant events.

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[4] George J. Stigler, "The Economics of Information," *J.P.E.*, June, 1961. Even a casual perusal of the current journals will provide evidence for the rapidly growing popularity of information as an economic variable. The most recent example to come to my attention is Malmgren's paper, "Information, Expectations, and the Theory of the Firm," *Q.J.E.*, Aug., 1961.

The examples cited are a sample, neither random nor systematic, of those that could be mentioned—almost all arising initially in the context of genuine practical decision problems. I might equally appropriately have mentioned the invention and development of sequential sampling theory by Wald, or Terborgh's analyses of optimal equipment replacement policies. (Professor Lintner, in the discussion, mentions another important example: the Renaissance of Bayesian statistical decision theory.) Or I could describe advances in the economic theory of distribution and advertising, no longer quite the neglected orphans that Stigler implies them to be in the passage quoted above.[5]

Now any or all of these developments could have come about without contact with practical decision-making problems. The theories are normative, not requiring data for their formulation or (in one sense, at least) their testing. The historical fact is that they were not discovered from an armchair. A proposition from search theory itself suggests the explanation for this historical fact: search begins when we are confronted with a problem for which no satisfactory solution presents itself.

Economists, statisticians, mathematicians, and natural scientists thrown up against concrete management problems discovered that the classical economic models paid little attention to the variables that were, in fact, crucial to rational practical action. All of us—economic theorists, management scientists, organization theorists—are satisficers when it comes to building our theories. We introduce new variables when we become aware that these variables are essential for explaining what we want to explain or solving what we want to solve. If information seeking is becoming significant for economic theory, it is because attempts to apply theory to the actual decision-making problems of the business firm have shown what a crucial role is played in decision by imperfections in our information and limits on our ability to calculate.

Attention to acquiring and processing information is only one way in which the decision models of management science have introduced new emphases into the theory of the firm. I may mention a few others. The new models are, of course, very much more detailed and disaggregated than the classical models. They introduce many decision variables in addition to the quantities and prices of standard commodities. The multitudinous consequences of decisions are incorporated partly in the criterion function—usually a cost or profit function. They are incorporated also in policy constraints that can be introduced flexibly to handle "factors not elsewhere classified"—long-range considerations that are difficult to quantify, certain aspects of uncertainty, complications arising from external economies or diseconomies, and others.

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[5] See, for example, Frank M. Bass *et al.* (eds.), *Mathematical Models and Methods in Marketing* (Irwin, 1961).

Implications for Resource Allocation Processes. What do the management science models tell us about the general theory of resource allocation, and the relative advantages of prices as compared with other allocative mechanisms? On balance, the introduction of formalized decision procedures incorporating such tools as linear programming and dynamic programming has tended to centralize the decision-making process. To be sure, the optimal solution of a linear programming problem can be interpreted in terms of classical marginalist principles, and quantities appear in the solution that have all the properties of prices. Nevertheless, in practice solutions are invariably obtained by centralized computations using algorithms like the simplex method and not by the *tatonnement* of a market. What are the reasons for this? Two are fairly obvious. First, with modern computing equipment, the solution-finding process is handled centrally at least as readily as it could be through decentralized price mechanisms. The decentralized procedures simply do not yield the savings in information-transmitting cost usually claimed for them. Second, since most of the internal "markets" involve bilateral monopoly, or something close to it, the exchange prices are administered and not competitive prices. Hence, most of the self-policing features of a competitive price system are absent.

There is a third important force toward centralization. In classical Marshallian theory, the principal reason for the existence of the firm, and for the use of administrative rather than market mechanisms for its internal decision making, is the presence of external economics in the operation of its parts. Frequently, the modern quantitative decision models of management science permit more careful attention to these external economies than was possible with simpler decision procedures, with the result that decisions are further centralized. It is common to find, for example, that without formal decision rules, almost independent inventory and production decisions are made by manufacturing and sales departments of companies. The resulting system behavior is far from optimal and often close to being dynamically unstable. Several quantitative studies suggest that such "arms-length" relations of manufacturing and sales departments in inventory policy can cause significant amplification of inventory cycles. Under these conditions, the co-ordination of policy permitted by centralized decision rules constitutes their major contribution to lowered costs.

Experience with the analytic tools of management science shows that the area in which marginalist principles are applicable is not coterminous with the area within which market mechanisms can be used effectively. The latter area is generally much narrower than the former. Under many circumstances, central planning authority and the other resources of organization are needed to secure the application of marginalist analysis to business decisions. Thus, the application of sophisticated marginal analysis within the firm is providing us with a great deal of information about the potentialities and limitations of prices and markets as allocative mechanisms—information whose usefulness for evaluating broader questions of institutional structure has yet to be exploited.

Organization Theory. I turn now to research of a less normative kind that has been directed largely toward understanding goal-forming, predicting, choosing, and control behavior in business firms. The classical theory has been criticized severely under all these heads. It has been asserted that the behavior of firms cannot be explained in terms of a profit-maximization goal; that classical frameworks for analyzing uncertainty are faulty; that the classical models falsify the process of choice; and that they ignore control processes entirely.

What are the facts? The central fact is that the facts are very scanty, indeed. Let us inventory them briefly:

1. There are anecdotal facts derived from the contacts of economists with business firms. Everything we know about how preconceptions color observations should lead us to mistrust these.

2. There are facts derived from sample studies of American business behavior. We have such facts on a variety of topics—business expectations and pricing practices, to mention two examples. The chief defect of these facts, and a very serious one it is, is that they are derived from questionnaires and, to a limited extent, interviews, and are consequently extremely sketchy. In surveys of practices, the facts are generally reports by businessmen as to how they make decisions, lacking independent checks of actual behavior.

3. There are facts obtained by intensive interviews and, to a limited degree, actual observations of behavior in individual business firms. The costs of intensive studies and the degree of co-operation required of the firms usually limit such studies to small and unrepresentative samples of firms. Hence, there are major difficulties in extrapolating the findings to American business as a whole.

4. There are facts obtained by studying in the laboratory behavior that is (intendedly and allegedly) comparable to the behavior that occurs in business firms. The problem with such data is to establish the validity of the extrapolations.

In addition, simulation techniques—with or without computers—

can be used to infer from any of these kinds of facts their implications for organizational behavior. (In his discussion of my paper, Professor Lazarsfeld has made some extremely valuable comments on several areas of sociological theory and method that are relevant to research on the business firm. Professor Lazarsfeld's suggestions are illustrative of the wealth of ideas for methods of investigation and theoretical concepts that the economist who wishes to study the firm at first hand can obtain from his colleagues in sociology.)

In enumerating the kinds of data that are available, I have emphasized limitations and gaps. There is a brighter side to the picture, to which I shall turn in a moment. First, however, I should like to emphasize strongly that neither the classical theory of the firm nor any of the amendments to it or substitutes for it that have been proposed have had any substantial amount of empirical testing. If the classical theory appeals to us, it must be largely because it has a certain face validity (e.g., "only those firms that maximize profits will survive in the long run") rather than because profit maximizing behavior has actually been observed. If we reject the classical theory, it must be largely because it appears to us to have a very low a priori probability (e.g., "firms don't have the information that would permit them to make profit maximizing calculations") rather than because any large body of data clearly refute it. As empirical scientists, we can only hope that in time the case will be different, that we will have the facts to test competing theories; it would be extravagant to claim that the time is now.

Developments in the theory of the firm have largely been of two kinds: (1) proposals for the revision of the theory to take care of objections that have been raised to it; (2) a variety of new techniques for securing data that would permit such proposals to be tested. These explorations have not yet been carried to the point where they give more than scattered indications of what the substantive answers will be.[6] Thus, in any assessment of the progress that has been made over the past two decades, we need to emphasize progress in methods for studying human behavior in the business firm empirically, quite as much as the new facts discovered or the new theories to which these facts give rise.

To give substance to these general comments, I should like to review briefly four specific empirical studies, chosen to illustrate the

[6] Perhaps I am bending over backward in disclaiming knowledge of which version of the theory is correct. Obviously, I have my opinions, and even a certain amount of data that I regard as supporting them. However, one of the characteristics of the scientific endeavor is that it is not necessary to settle issues until enough evidence comes in—and even then they can always be reopened. In the present instance nothing is gained by claiming that the evidence is sufficient when it is so patently inadequate.

range of techniques available for empirical research. In the first example, interviews in the business firm are the primary source of data; the second employs a laboratory experiment; the third includes direct observation of the decision-making process; in the fourth, computer simulation is used as a means of analyzing and interpreting the data.[7]

Pricing Decisions. The setting of prices plays a central role in classical theories of allocation—especially in theories of imperfect competition. It is not surprising, therefore, that pricing decisions have been studied empirically more than almost any others. The approach has generally been simple and straightforward: if you want to know how a businessman sets prices, ask him.

Obvious objections can be—and have been—raised to finding out about a decision-making process by asking the decision-maker. Does he know; and will he tell. Perhaps much of what the decision-maker does is "intuitive" and judgmental, resides in his subconscious when he does it; and perhaps not all, or most, of it can be recaptured even by retrospection. Moreover, how is the businessman motivated to reveal to the researcher his *modus operandi*? In certain circumstances, does not he even lay himself open to risks of antitrust prosecution if he describes how prices are set?

An increasing number of studies based upon extensive interviews in business firms show that these problems can usually be solved satisfactorily. For studies of pricing decisions, interviewing has many advantages over less intensive techniques using questionnaires. To be sure, both methods elicit answers to questions posed by the researcher. But the information gathered through interviewing in a firm can be orders of magnitude more detailed than the information obtained from questionnaires. Respondents probably provide less deliberate misinformation in a face-to-face interview than in a mail questionnaire, and when they consciously warp the facts, they are more easily found out. The interview need not rely on general statements of practice but can probe these by applying them in detail to concrete examples or instances. The interviewer can explore, for example, the exact sequence of decisions and events in the most recent price changes the firm has made. He can see whether these events are consistent with the replies he has received about general pricing practices and procedures, and can ask for—and usually get—clarification when there are apparent discrepancies.

Finally, the interviewer need not rely on a single respondent in the firm but can usually get access to a number of executives and functionaries who participate in different aspects of the pricing decision. Almost everyone who does this for the first time is surprised to find how diffusely information about policies and practices is scattered among individual participants in a large business organization, and what a fragmentary picture each single individual has of the whole process. Thus, a major consequence of the use of interview techniques is to replace the classical reification of the firm as a single "entrepreneur" with a model of a complex organization comprised of many interacting parts. It is at this stage of inquiry that organizational considerations begin to play a major role in interpretations of the decision-making process.

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[7] I have drawn most of my examples from work I know at first hand. Hence my discussion may well sound parochial. It is in no way intended as a survey of the field and I hope my discussants will help correct my myopia by citing some of the important work that has been done on other campuses.

For example, the authors of the Brookings study, *Pricing in Big Business*, make the observation that in large multiproduct firms it is one thing to adopt a policy of "maximizing return on investment" or even of "securing a satisfactory return and share of market"; it is quite a different matter to set up procedures that will reflect these and other relevant policies in setting the prices of the individual items the company sells.

The difficulties in relating procedures for pricing items to general price policies do not reside solely or mainly in conflicts of interest between the owners of the firm and subordinate managers. Even apart from such conflicts, price setting involves an enormous burden of information gathering and computation that precludes the use of any but simple rules of thumb as guiding principles. Through detailed study of pricing by multiple interviews throughout the firm we begin to get a picture of the informational and computational constraints that hedge in the pricing process and give it form. We learn, for example, that whatever the shape of the real world, the world that his accounting figures reveal to the businessman is usually one of constant marginal costs, virtually up to the point where output equals full capacity. With this knowledge, the businessman's wariness of price competition takes on a new interpretation, quite different from that given it by classical theories of monopoly and imperfect competition.

Laboratory Experiments on Organizational Decisions. Discovery of major discrepancies between the classical theory of the firm and the decision-making process as revealed by interviews whets the appetite for explanation. We can conjecture why these things are so—as we have just done in the last paragraph. But how test our hypotheses? The laboratory offers one possibility. From interviews, we reach the conclusion that executives who occupy particular positions in firms acquire estimating biases induced by, and characteristic of, those positions. We should be able to abstract the essential characteristics of the positions, say, of sales executives and production executives, respectively, and to create abstract analogues of these positions under laboratory conditions. If the explanation of the estimating biases is correct, then the corresponding biases should appear under the laboratory conditions. As in the natural sciences, we can sometimes test our understanding of a phenomenon by trying to produce that phenomenon in the laboratory.

Some experiments by Cyert, Dill, and March illustrate this approach. In one experiment, subjects were asked to estimate a quantity on the basis of two previous estimates purportedly made by other persons. Under one experimental condition the subjects were told they were "cost analysts" and that the numbers were predicted costs of a new product. Under the other condition, they were told they were "market analysts" and that the numbers were predicted sales of a new product. Both groups were given the same data from which to make their estimates. The "cost analysts" consistently made higher estimates than the "market analysts." In a somewhat more complex experimental design, the same investigators were able to induce estimating bias by motivating subjects to estimate high or low, but also to induce corrective processes as subjects anticipated and adjusted for the biases of the others who were collaborating with them.

Notice that in this way of using the laboratory as a data-generating device complementary to the field study, we meet halfway the usual objections against extrapolating casually from laboratory to real-life situations. Generalizations are not extrapolated from laboratory to field. Rather the laboratory is used as a further check on our understanding of phenomena that we have already observed, and tried to explain, in the field.

The Observation of Decision Making. Students who have progressed from the arm chair, to the questionnaire, to the interview, to the laboratory in their desire to discover how decisions are actually made in the business firm find it relatively easy to take the next step—actually to watch decisions in the course of their manufacture.

Decision-makers are, in fact, unconscious of many of their own judgmental processes. Moreover, even when their motives are of the best, they are unreliable witnesses about what has happened in the past. The very positional biases that the study of executive thinking has revealed make their testimony suspect when it rests on memory of events that have passed through the selective filters of perception and interpretation. These deficiencies in the data can be reduced greatly if decisions are studied contemporaneously rather than retrospectively.

But what does it mean to "observe" decision making? The decision-making process is at best a stream of words and at worst a stream of thoughts. The former, if not the latter, can be captured and recorded. And now the fact that many persons participate in a business decision comes to the aid of the researcher. In individual human problem solving and decision making, the whole process can often take place inside a human skull, completely screened from observation. In organization problem solving, the stream of thoughts cannot go on very long without being accompanied by a stream of words. If the words can be recorded, a great deal can be learned about the process.[8]

As we proceed from the questionnaire through the interview to the observational study, we gain a great deal in the richness of the detail of process that we can observe. The price we pay is to give up any notion of sampling a universe of decisions in favor of making a careful record of one or a few. Both the cost of such studies and the problems of finding business firms that can and will permit them to be carried out make formal sampling notions inapplicable. Hence this approach rests on the assumption that we can reach an understanding of mechanisms through detailed study of processes without sampling in the ordinary way.

An example of this kind of intensive study of decision making is an investigation by Cyert, Dill, and March. They studied decisions by a steel company to invest in new capital equipment, in order to determine how expected return on the investment was estimated and how this factor was weighed against others in determining priorities among projects. The summary of this particular study will illustrate the picture of the decision-making process that is emerging from such work.

Three major features of this decision process are particularly interesting from the point of view of the place of expectations in a theory of business making. First, it is clear that search behavior by the firm was apparently initiated by an exogenous event, was severely constrained, and was distinguished by "local" rather than "general" scanning procedures. Second, the noncomparability of cost expectations and expected returns led to estimates that were vague and easily changed and made the decision exceptionally susceptible to the factors of attention focus and available organizational slack. Third, the firm considered resources as fixed and imposed feasibility tests rather than optimality tests on the proposed expenditure.

Clearly, we are viewing a resource allocating process here that is decidedly different from the price mechanism. One of its significant characteristics is that it is capable of operating in situations, like this one, where the relevant marginal quantities are not thought to be computable.

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[8] In point of historical fact, some of the social psychologists who pioneered in the study of problem solving and decision making in groups did so not because they were interested in organizational phenomena, but as a means of externalizing the phenomena and making them accessible to observation.

Computer Simulation of Decision Making. As research moves toward more and more intensive and detailed observation of the decision process, it is soon faced with the historian's dilemma. How can this vast mass of fact be reduced to order as a first step toward interpreting it and generalizing from it? Although it is some centuries since astronomers have thought of the matter in this way, they too were once faced with the same dilemma. They had voluminous data on the locations of the heavenly bodies at many points of time. The first step was to describe these in terms of geometrical paths—the cycles and epicycles of the Ptolemaic system. A little later these paths were simplified to the circles of Copernicus and the elipses of Kepler. But the great simplification came, of course, with Newton, who showed that the scheme of the heavens could be represented far more parsimoniously by replacing the time paths of planets with the differential equations that generated those paths.

For centuries after Newton, systems of differential or difference equations provided the model of "ideal" scientific explanation of dynamic systems. The modern digital computer, with its very general capacities for representing symbol-manipulating systems, opens to us the same possibility for explaining the time stream of a decision-making process by means of a computer program for simulating—i.e., generating—that stream.

The feasibility of reducing detailed historical data on decisions to programs capable of generating them has now been demonstrated by actually carrying it out in a number of instances. (On a much more macroscopic scale, the same approach has been adopted for theorizing about the economy. Orcutt's model of household behavior stands midway between classical macroeconomic dynamic models and the detailed microeconomic models we are discussing here.)

A program to explain the processes of a company deciding to install a digital computer was sketched out by Cyert, Simon, and Trow. A much more detailed program has been flow-diagrammed to represent the decision-making processes of a department store buyer. And recently, Clarkson has produced a computer program that predicts in great detail the decisions of the investment officer of the trust department of a bank. Although there are not yet many examples in the literature, investigations of a comparable kind have now been carried out by other workers.

Thus, with the advent of the high-speed digital computer, economics has acquired a new theory-building and theory-testing tool that will enable it to handle far more detail of the firm's behavior than could be treated in the past. With optimism we may even hope that the demands of the institutionalists for faithfulness to the facts will no longer seem irreconcilable with the demands of theorists for facts that are manageable. We will feel less constrained to believe in a particular kind of world just because it happens to be a world that is easily theorized about.

Conclusion. In painting this picture of what has been transpiring in the theory of the firm, I have faced a difficult problem of selection and sampling, which I have solved largely by emphasizing the work with which I am most closely familiar. I have discussed a few general trends and developments that seem especially significant: the contact with problems of the firm that was induced by the growth of management science, and the increasing attention to problems of information flows that was engendered by that contact; the growth of techniques for studying the decision-making process in great detail and from vantage points within the firm; the study of the firm as a multiperson complex organization; the first steps toward exploring the use of computer programs as a new way of theorizing about complex systems.

On the substantive side, our new knowledge of the decision-making process betokens a major advance over the next few years in the general theory of allocation. Two centuries ago, economic theory discovered, in the price mechanism, an allocative procedure possessing quite remarkable properties. These properties and their application to the regulation of an economy have been pretty thoroughly explored by successive generations of economists. We are now becoming increasingly aware that the price mechanism is just one—although an exceedingly important one—of the means that humans can and do use to make rational decisions in the face of uncertainty and complexity. We are beginning to understand what some of the other mechanisms are and how they are used.

Epilogue. Those economists who are not specialists in the theory of the firm may well ask what implications these developments have for general economics—and particularly for the traditional core of the profession's interest in public policy and welfare economics. I think there are at least three kinds of implications that deserve attention.

First, conclusions about welfare in such areas as tax and antitrust policy depend in an important way upon the underlying postulates about the behavior of the individual firm. The picture of the firm that is emerging from the new research is that of a searching, information processing, satisficing, allocating mechanism. It is doubtful that the propositions that hold with the assumption of static, profit maximizing firms under conditions of certainty also hold for such firms. Professor Baumol has already provided examples of how conclusions about tax incidence have to be modified if we assume the firm to be a sales maximizer rather than a profit maximizer.

Second, the great plan versus no plan debate hinges in considerable measure upon empirical propositions about how price mechanisms and planning mechanisms in fact operate: what costs they impose of information gathering and computing; how stably and rapidly they adjust the system to environmental change. Studies inside the business firm are providing us with a great deal of factual information about the costs and administrative problems associated with various allocative mechanisms. These facts are already calling into question beliefs that allocation through markets simplifies information processing as compared with centralized allocative processes.

Third, when we try to apply classical models to actual decision-making problems within the firm, we find that important modifications and improvements have to be made in these models if they are to operate successfully with the kinds of imperfect information that are available in the real world. From these necessities have emerged inventions like linear programming and modified concepts of rationality like the satisficing concept. As we move from the decision-making tasks of the individual firm to the greater complexities of public decision making for the economy, we discover an even more pressing need for the improvement of the classical tools of analysis. The tool-building innovations in management science are already providing answers to some of these needs—witness, for example, the applications of linear programming to economic development by Tinbergen and his colleagues. The "new realism" in the approach to the firm's decision problems may also prove a major force toward moving welfare economics back from the position of rather excessive formalism it has reached in recent years to a more direct concern with, and ability to handle, concrete policy problems.

For these reasons, we may expect rather confidently that the rapid progress that has been taking place in our understanding of the business firm will induce secondary changes of considerable magnitude in the other branches of economic theory.

DISCUSSION

W. Allen Wallis: Mr. Simon's paper is a worth-while contribution to these meetings, and Mr. Simon deserves our thanks. The paper will become a valuable contribution to the literature, too; so Mr. Simon also deserves our congratulations. The paper is both informative and analytical. It tells some of the specific things that have been going on in the study of the firm, without being too detailed or technical; and it gives some enlightening and suggestive interpretations and evaluations, without being too high-flown, abstract, or speculative.

I must confess that I was somewhat surprised when I first read the paper. I had expected to find a definition of the theory of the firm and some indication of the theory's objectives. Perhaps such a definition can be found on a second reading—at least between the lines. Also, I had expected to find a comprehensive and systematic catalogue of work on the theory of the firm in the past decade, or past year, or some similar period.

On reflection, I see that Mr. Simon was well advised to avoid the pretentiousness of a full-scale review of the field, and to confine himself to the more modest objective of reporting, for the most part, the work with which, as he says, he is most closely familiar; namely, the work which he, his students, and his colleagues have done. That is an impressive enough body of work, and the paper is an impressive testimonial to the quality, amount, and scope of the work done in the business school at Carnegie Institute of Technology.

What seems to me the most interesting theme of Mr. Simon's paper is embraced in this sentence: "We are now becoming increasingly aware that the price mechanism is just one—although an exceedingly important one—of the means that humans can and do use to make rational decisions in the face of uncertainty and complexity."

I have a question to raise about that sentence, though the objection that the question suggests is secondary or tangential to the primary content of the assertion. Is it really true, as the sentence implies, that we tend to assume that the price mechanism is the only means humans use to make rational decisions in the face of uncertainty and complexity?

I think it is not true. If there exists any group to which the "we" in the sentence refers, it must be a small group of economists. I might even venture to suggest that if there is such a group of economists, they must be at the University of Chicago. If they—or even one of them—were at the University of Chicago, I would know about it; and I don't.

Surely if you consult economists who understand the price system (and it is at best an open question whether that is a majority or a minority of the profession), they will tell you that the price system is an important and effective mechanism through which societies can make certain kinds of decisions in ways which approximately meet criteria that can appropriately be subsumed under the rubric "rationality." I draw to your attention that the price system is a mechanism for social decisions, not individual decisions, and that it leads only to approximate optimality by its own criteria; and that these criteria, while I personally am convinced of—and could give analytical support for—their merit, have neither the self-contained logical inevitability of a mathematical theorem nor the self-sufficient appeal of a religious revelation.

If you consult social scientists other than economists, you will be hard pressed to find any who understand that the price system may be an effective means of making any social decisions rationally. In fact, since Mr. Simon is a political scientist, I challenge him to name more than a handful of others in his profession who understand this proposition.

Again, if you consult statisticians, far from thinking of the price system as *the* way to make rational decisions in the face of uncertainty, they will tell you that is what statistics is all about. In fact, my favorite introductory statistics textbook gives as its opening definition: "Statistics is a body of methods for making wise decisions in the face of uncertainty."

What I am getting at is that it always has been recognized that within the limits that comprise an economic system—that is, within families, within firms, within governments, within eleemosynary institutions—much rational decision making has depended on logic, mathematics, engineering, psychology, judgment, hunch, intuition, prejudice, and tradition.

Coming back to the direct thrust of Simon's assertion, it is undoubtedly true that limitations on the ability of economic units to make these internal adjustments efficiently and accurately has been a powerful force restricting the size, defining the scope, and influencing the organization of economic units. These limitations have consequently been a factor extending the area in which organization through markets is the most efficient organization.

As limitations on internal efficiency are reduced through advances such as those Mr. Simon has described, the area of organization through markets is correspondingly reduced. The current "urge to merge," for example, may be partly explainable by this increased internal efficiency, though so many governmental forces push in the same direction that it is hard to claim more than a possibility here.

The forces that Simon has mentioned as reducing the proper scope of the price system are, of course, offset by other forces that tend to extend the proper scope of the price system. Growth of the total economy, and of trade, for example, tends to favor increased specialization, for as Adam Smith said, the division of labor is limited by the extent of the market.

Also, there are many parts of the public sector of the economy where services could be provided more efficiently through the market, even though at public expense. Schools, highways, postal services, and social security are examples.

In short, the force that Simon points out is an important one, and his analysis of it is enlightening, but from an over-all view of the economy it is simply one of a number of forces of undetermined magnitude, whose resultant may be in either direction.

In conclusion let me repeat my thanks and congratulations to Herbert Simon and his colleagues for this exposition, which is an impressive tribute to the excellent work done at one of the country's top business schools.

PAUL F. LAZARSFELD: Professor Simon divided his paper into two distinct parts: the contributions of operational research and those of organizational theory, or as some of us sociologists prefer to say more modestly, organizational analysis. Obviously, I can only comment on the second part and even then I want to restrict myself to three points.

The speaker correctly states that, at the moment, what organizational analysis contributes to the theory of the firm is largely methodological in character. He points to four main types of work: (*a*) retrospective interviewing on how individual managers made specific decisions; (*b*) laboratory experiments to test various interpretations of the process of decision making; (*c*) concurrent observations as to how decisions in the making come about; and (*d*) computer simulation.

I agree completely with what Simon says about experiments and I have nothing to contribute to the simulation problem. I would, however, like to expand somewhat the remarks made on retroactive interviews, clarify what I think is somewhat vague in his comments on concurrent observations and finally add a fifth and I think important item to the list he offered.

Simon and his collaborators have published a number of illuminating case studies of changes within a business organization. Elsewhere I reviewed with deserved appreciation the sensitive observations made in these reports; but I added one reservation which I might be permitted to quote here. The authors write "that they did not 'wish to try to transform one swallow into a summer by generalizing too far from a single example of a decision process.' But why, it might be asked, did they not take notice of the thousand and one swallows nesting in similar publications by students of consumers? The notion of a search is very much akin to the shopping of the housewife or the deliberation and hesitation of the car-buyer."

For the last twenty years social scientists interested in market research have explored the conditions under which actors can give valid accounts of the factors which affect their choices. Thus, for instance, we know that only fairly recent decisions can be meaningfully probed. A person who switched brands a few weeks ago can usually account for the change quite well; if he has smoked the same cigarettes for the past five years it makes no sense to ask him why he does so. Furthermore, the question "why did you . . ." is probably a good way to start a conversation but in itself is not logically meaningful. A well-designed study will concentrate on the weight to be given a few major factors and will collect additional material to make sure that the main target of the inquiry is really reached. Thus, for instance, it is claimed that people do not like to concede that they were influenced by advertising. But this legend is due to faulty research procedures. True, if we just ask "why did you change to Maxwell House coffee," we are likely to hear a reference to some attribute such as "it is good to the last drop." Correct procedures require that we then ask "how did you know it would be good to the last drop before you tried it." Thereupon many respondents will say that they saw it advertised this way and hoped that a cup of this brand will have less unpleasant residual at the bottom—or, more generally, the proportion of the people who then explicitly refer to advertisements jumps by some 20 or 30 per cent.

Studies of this kind lead to useful generalizations. Thus, for instance, we are fairly confident today that the importance of personal advice is greater than that of formal advertising. We also know, however, that the advisers are more likely to be affected by advertisements than their advisees; and so we have come to talk of a two-step flow of influence by which the mass media reach the general population. In many other ways the process of search and deliberation can be traced and quantified. In buying durable goods, for example, the very rich people deliberate less because the amount of money involved is not of enough importance to them. Relatively poor people also use less information: they are less educated and their skill in searching is correspondingly underdeveloped. It is the middle-income group which makes most extensive use of the devices by which they can "maximize utility"; this finding, reported by Katona, jibes well with the general picture social scientists have of the middle class.

The techniques which I have exemplified, often called "reason analysis," have been quite well codified. They are best described in the fourth edition of Zeisel's *Say It with Figures*. There you will find a great variety of examples. Voting, occupational choices, and many other acts which are performed by many people under roughly comparable conditions have provided experience and data for this kind of analysis. I feel that Professor Simon and his colleagues have not availed themselves enough of this tradition. Managerial decisions are often very complex; and yet certain alternatives could surely be studied in a much more systematic way than his speech has intimated. Thus, for instance, it would not be difficult to weigh the relative role of factual information, experts, and trusted friends of the manager. As a matter of fact, a study by Herbert Menzel, of Columbia University, among prominent scientists has analyzed quite clearly the relative role of casual personal contacts as compared to scientific publications as sources for the germinating of new ideas. One more example. Simon quotes a case where "it is clear that search behavior by the firm was apparently initiated by an exogenous event. . . ." In consumer research it is quite traditional to distinguish brand changes according to whether they were motivated by dissatisfaction with the old brand or by some attraction to a new one. Again, to show the generality of the method, the distinction between push and pull is a standard feature in the study of migration. It would not be too difficult to study systematically and in quantitative terms the conditions under which a change is inaugurated, say, by the foresight of a leader, through the routine functions of a development committee or in reaction to an unexpected problem.

I do not want to claim that sociologists alone know how to do retrospective interviewing. One of our panel members, Professor Lintner, has done remarkable work of this kind when he and his colleagues studied the effects of taxation on managerial decisions. I just want to make sure that Simon's remarks are not taken to mean that we must start from scratch when we want to enrich the traditional theory of the firm with concrete empirical data. I might add that the techniques I am referring to permit quantitative aggregation over a larger number of cases and therefore lead to generalizations which go well beyond the study of individual instances. What generalizations one should look for, what problems are relevant from the economists' point of view, and what modification of existing interviewing methods that will require I am, of course, not in a position to tell.

Now I turn to what Simon's paper calls "the observation of decision making." It seems to me that at this point he fuses four elements which need more careful distinction: participation, documentation, interaction, and duration. It is patently true that when the social scientist is permitted to watch board meetings or to listen in on telephone conversations he obtains a great deal more material than what even the best retrospective interview could unearth. When it comes to the use of documents, correspondence, and minutes, the difference is not so great. After all, even if we interview a manager on a past decision we can ask him to supplement his recollection by whatever pertinent material he is willing to let us see. Also the interaction of various partners in a decision is not so exclusively bound to concurrent observation. We can make retrospective interviews with a number of people and check their recollections against each other. To return once more to the consumer field, in a study carried out at Columbia we asked housewives to tell us who advised them on certain purchases; we then interviewed all the people who were mentioned in the narratives of the first set of respondents. We expected that the second set of interviewees would overplay their role as advisors. Actually, the opposite was true. Quite a number of them reported the same conversation as a discussion and were not aware that their opinion influenced the partner in his ultimate buying decision. Such multiple retrospective interviews could be carried out in firms and discrepancies between reports can lead to rather interesting insights. This way, for instance, the phenomenon of "sensing" was established. Warren Breed found that cub reporters on small newspapers try to guess the prejudices of their editors; they had often exaggerated notions of what the boss really expected. Later a similar discrepancy was noticed in insurance companies. New members of the investment department sometimes refrained from making reasonable suggestions because they assumed that certain members of the board would be opposed.

My only disagreement with Simon's paper lies with the fourth element, which is implied rather than made explicit in the notion of "observation." All decisions take time and the observer cannot be present continuously. When he should make his observations therefore becomes crucial. Partly, of course, this is determined by the very structure of the event: he will want to be around at as many committee meetings as possible, and he will want to talk with a manager just before and just after he has met with an important client or contractor. But such events or critical episodes may sometimes be widely separated in time, and concurrent observation might require the recording of data in a way quite similar to the use of time series. The Department of Commerce asks a sample of firms every three months what investment plans they have for the next period and what actual investments they have made in the preceding period. The latter decision might have been made any time within the last three months; what matters is the discrepancy between the intended and the actual investment.

A systematic and comparative study of a large number of decisions may similarly require cutting into the decision process at regular time periods. Just for the sake of speculation, suppose a number of people involved in a major managerial decision were asked every Wednesday a series of rather simple questions such as the following: whether their opinion of the preceding week has been firmed up or changed; with whom they discussed the matter since the last interview; what new information they asked for or acquired accidentally; etc. A statistical cross analysis, simultaneously across questions and across time periods, can give an aggregate picture of the decision process very similar to the dynamic time series analysis which economists, I understand, relate especially to the work of Tinbergen. In the consumption field, such studies are usually called panel analyses. For instance, a study of automobile buying, which extended over a period of nine months, brought out at least one fact that might have been easily overlooked otherwise. People say one month that they will buy a new car within the next few weeks; a month later they say that it will take them another eight weeks before they will go ahead. What has happened in between? An unexpected medical expense? A competing product so much more alluring that it drained all available funds? In other cases at the time of the first interview, the purchase was expected three months hence but was already consummated at the second interview a month later. Is this acceleration more frequent when a neighbor bought a car during the preceding month? Is it more likely to happen in families where all members are especially eager to buy a new car—a piece of information which hopefully we obtained in the first interview so that it cannot be given as retrospective rationalization. The application of the panel technique to managerial decisions deserves more careful attention.

To reduce this critical remark to its essence: Simon's notion of observation includes as a minimum both participant observation and a certain duration over time. Part of this element requires presence at crucial moments, but they might vary from case to case. Periodic repetition of a number of basic questions permits comparative aggregation over a larger number of cases and might well lead to generalizations much more useful than the best described single case. I do not want to be misunderstood. I am not opposing the statistical approach to the case study. Both are needed. I just have the feeling that in the present paper Simon happens to give the impression that the social scientist has a predilection for anecdotes. Before an audience of economists I want to stress that using behavioral data can lead to statistical findings which should and could be meshed with data on prices and quantities which form the core of the economists' analysis. This brings me to my last point which is neither an extension of one of Simon's observations nor a criticism of another; it is, instead, the addition of a fifth technique to the four he has discussed.

Due to increased research funds and the growth of computing facilities, there has developed a new type of study in social research which, at least in our field, opens up vast possibilities. Around 1930 the appearance of sampling techniques and the development of interviewing skills led to the rapid development of surveys. They provided us with quantitative information on people's attitudes, habits, and expectations which then could be compared for different income groups, for regions, and so on. But these surveys also had drawbacks. They gave an atomistic picture of the social world. In the last few years this situation has radically changed, because we have now begun to sample simultaneously people *and* the organizations in which they live and work. Rapidly there became available studies of the following kind: 6,000 interns in 200 hospitals; 3,000 professors in 150 colleges; 1,000 union members in 50 different union locals. This kind of material has led to what some of us now call contextual propositions. We find that certain interrelations between individual characteristics can be quite different according to the context in which they are observed. In small union locals, for instance, when the members sense that they disagree politically they try to avoid political discussions: the peaceful maintenance of the union local becomes the overriding interest. In large union locals the members do not mind expressing and battling out political disagreements; there is an opportunity to form small homogeneous subgroups which can combine into coalitions without breaking up the larger unit. Another example comes from a study of what happened in American colleges during the McCarthy period. In colleges where no major incidents of attack had occurred most professors were nevertheless apprehensive because each of them had read about persecutions in other institutions; but in these quiet colleges the average professor underestimated the apprehension of his colleagues because there was little local talk. In turbulent colleges, in which a large number of attacks on academic freedom took place, the reverse was found. Most professors overrated the apprehensions of their colleagues because there was so much discussion of the episodes. The relation between one's own apprehension and that imputed to one's colleagues is therefore not just a psychological phenomenon; it depends on the larger context in which the matter is studied. Studies of this kind are rather complex and do not lend themselves to easy summary. For example: J. S. Coleman, *The Adolescent Society;* P. F. Lazarsfeld *et al., The Academic Mind;* S. M. Lipset *et al., Union Democracy;* and H. C. Selvin, *The Effects of Leadership.*

I do not yet know of any corresponding study in the business field but the idea is obviously quite applicable. The branch offices of banks, the local agencies of insurance companies, and many other business structures lend themselves to this kind of double sampling and the corresponding contextual analysis. As a matter of fact, there is at least one study in which the transition is obvious. Paul Lawrence, of the Harvard Business School, has over a period of several years followed the efforts of a large chain of food stores to give more responsibility to the managers of their local stores. With limited funds, he could only study a few branch stores. But he found clear statistical evidence that, in the interaction between regional supervisors and the local store managers, originally the former took all initiative. Two years later, in two of his stores, it was the managers who brought ideas to the supervisors and took the initiative in their local activities; in one other store the efforts toward decentralization did not succeed. Lawrence interpreted his findings as best he could in the light of his case observations. Suppose he could have studied a score or so of these local stores; he might then have developed cogent generalizations as to the conditions under which organizational change does or does not succeed.

Professor Simon was an ideal choice to be the main speaker on this occasion. Quite a number of disciplines claim him proudly as a member. I took it as my task to comment on those of his remarks which are closely related to empirical social research. I know that he and I are in agreement as to the advantages and limitations inherent in the application of modern social research techniques to neighboring fields, such as economics. I hope that my elaboration of some of his points did not entail for you too high a cost of what is still very limited information.

JOHN LINTNER: In the happy tradition of our sister British associations, principal discussants move and second a vote of appreciation to the speaker for this contribution. In keeping with this tradition, I should like to move our appreciation to Professor Simon for the excellence of his response to our President-elect's request that he present the invited lecture of this year's convention. His paper is replete with the penetrating insights and breadth of vision which we have come to expect from him. In my own remarks, I should like to endorse and give special emphasis to some of his points—since I do find myself in general, and in many respects even emphatic, agreement with him—but also to fill in some apparent lapses and register some disagreements which seem to me at least to be of considerable importance.

In the latter part of his paper, for instance, Simon enumerates four different research approaches to the study of decision making in business organizations. It should be emphasized that these are not four alternative roads to Rome, but that each of the four approaches Simon enumerates (and others) can usually be used in combination to obtain far better results than are available with any one separately. For instance, simulation is not the only way to confirm the accuracy of personal observations, as seems to be implied; more usual statistical and econometric work is frequently an entirely feasible and even more convincing approach—as was the case, for instance, in my own studies of dividend decision making (*A.E.A. Papers and Proceedings,* May, 1956). I was also struck by the fact that Simon failed to note that one of the very important disadvantages of decentralized decision making is found in the well-confirmed fact that the goal structures of different decision-makers not only differ widely among themselves but differ from those of the top management of the firm; that the conditional rewards and risks of different subordinate decision-makers within a firm are often asymmetrical in ways which bias their judgments vis-à-vis the welfare of the firm as a whole; and that different people in different parts of an organization will have different judgments regarding the unknown probability distributions and tend to make decisions in terms of different estimates of the "missing data" (current or future)—and often do so in ways that are not only inconsistent between different parts of the organization, but inimical to the over-all goals of the firm itself.

It should also be remarked that Simon gives only a brief summary of the new developments in the theory of the firm, and in these emphasizes the approaches and contributions growing out of the work of himself and his colleagues. Perhaps Simon's decision to spend most of his time on the broader implications of the developments he does include represents his satisficing response to the problem he faced in giving a paper on the topic assigned when there have been symposia in each of the last two conventions on the same topic, and another on simulation—all following his major invited paper on "Theories of Decision Making in Economics" just two and one-half years ago. And surely it has been appropriate for him to dwell so extensively and perceptively on the larger significance of these developments for economics in general before this audience. In my judgment, at least, his assessment of these broader implications was eminently sound and perceptive. In particular, the great advances in the "behavioral," "descriptive," or "scientific" managerial economics of the last decade unquestionably point up the necessity of recognizing and attaching new importance to allocative mechanisms other than a price-cost calculus, and have profound implications with respect to the attainment of the traditional welfare criteria in the allocation of resources within the economy as a whole. Indeed his emphasis on four different allocative mechanisms at work in the economy, of which the price system is only one, should provide a healthy antidote to a certain (and often marked) myopia of economists professionally bred and nurtured in what is regarded as the purest classical tradition.

I very much missed in Simon's discussion, however, any consideration of how these "positive" and "scientific" advances in our discipline can be related back to the requirements of a normative managerial economics. One way in which they can do so is of course immediately clear and was doubtless taken for granted by Simon in his text: any optimizing decision-maker will find that his decisions are better if improvements can be made in the forecast that he can make on the basis of his descriptive or scientific knowledge of what the decision processes and hence the reactions of his customers, his competitors, his workers, or his suppliers will be. But even retaining the gross simplification of a firm as a single decision-maker, improved informational inputs processed in the way that decisions have been made gives only part of the gain that is attainable. Other recent studies have used simulations to determine the results which *would* follow *if* decisions were made in different ways. Carrying the process further, it should be possible to present these results to the responsibile decision-maker who can then say whether he prefers the results of the decision rule currently being used or the new alternative. By successive comparisons it should then be possible to gradually evolve increased understanding, not only of what kinds of changes will represent "improvements," but also ideally to determine the shape of an implicit utility function not otherwise observable, and indeed (by search procedures if you like) to locate the optimum upon such a function—which, incidentally, will almost certainly turn out to be multivariate with interaction terms.

In many respects, the exciting and fruitful recent developments in Bayes-

Ramsey-Savage decision theory, to which my colleagues Raiffa and Schlaifer have contributed so notably, offer even more promise in the further development of normative managerial economics. Perhaps Simon failed to make any explicit mention of this work because he thought it implicit in his reference to management science and operations research, but it seems more probable that the omission was deliberate in view of the positions he took in *Models of Man* and in his recent *Review* article (*A.E.R.*, June, 1959). It is quite true that the binary choice experiments of Estes, relied on heavily by Simon, had indicated that people are "pattern-matchers" or "event-matchers" rather than maximizers of expected utility even when conditional gains and losses and probability distributions were known in advance. But I understand (largely through my colleague, Fouraker, who was a collaborator in related research) that the late Sidney Siegel's unpublished but completed research has substantially modified these results. By introducing reinforcements (monetary gain if right, none if not), Siegel found that behavior passed through a stage of event-matching behavior and asymptotically approached utility maximizing behavior, so long as the utility of the pay-offs of right responses exceeded the disutility of sameness or monotony.

Let me be clear: I am not saying that most people maximize in most decisions most of the time—indeed (as for instance in the *A.E.A. Papers and Proceedings,* May, 1954) I have always emphasized that descriptively behavior as observed often differs markedly (and in relatively systematic ways for substantial periods) from optimizing behavior and that these observed patterns, not the implications of presumed optimizing behavior, are what is relevant in judging, for instance, the effect of a change in tax rates on real investment, or the effect of a price or promotion change for a firm in oligopolistic markets. But I would strongly agree with the position of Savage, and more recently Raiffa (*Q.J.E.*, November, 1961), that when the wit, imagination, and brains of the researcher show people how they can eliminate their inconsistencies and achieve optimal decisions, relative to their true underlying preferences and their judgments, that they will move markedly toward, if not to, optimal action points. Indeed, taking account of such things as psychic costs of new decisions and of change per se and of the fact that both information gathering and information processing have costs, we can, I think, say that people will maximize subject to their constraints, costs, opportunities, and underlying preferences, when shown how. While this may be regarded by Simon as satisficing vis-à-vis the position of a hypothetical, omniscient man having and using a telephone line to the Lord continuously and efficiently, nevertheless in the real world where actions, information gathering, information processing, and the fact of uncertainty itself all have costs, it does represent the normative ideal of optimizing behavior.

Moreover, I am not saying, as was suggested at the end of the symposium last year, that managerial economics will contribute to economic theory primarily by leading economic agents to behave more nearly in accord with traditional models of rational behavior, thereby increasing the predictive power of received models and doctrine. The world is dynamic, not static, and uncertainty does have an unavoidable cost which may perhaps be minimized but never eliminated. In all "large" decisions both the form and parameter values of the relevant utility function and the parameters of the relevant subjective probability distributions are necessary components of any rational, consistent, optimizing decision rule except under most exceptional circumstances of limited relevance. Managerial economics will require modifications of theory to fit the facts, as well as modify behavior to more nearly fit theory.

The need for further developments involving the interplay of normative and "scientific" work may be further suggested by considering recent developments in the theory of the firm in a longer historical prospective. Simon refers to business firms as a boundary—and is tempted to say, the no man's land—between economics and administration. Looking back over the history of our broad discipline, it would be reasonably accurate to regard the economics of the firm as the no man's land—or at best, the "few man's land" of economics itself, with significant contributions relatively few in number and widely spaced in time until the great "take-off" (to borrow the Rostovian term) some ten years ago. From the significant plateau represented by Marshall's *Industry and Trade* and the *Principles* three-quarters of a century ago and the major advance represented by Clark's *Economics of Overhead Costs* some forty years ago, the other major contributions to the economics of the firm prior to the recent take-off can be numbered on the fingers of one hand. The Schumpeter of the next generation writing the history of the development of economics may find this hard to explain in view of the fact that more than 85 per cent of the gross national product in this country for decades has arisen within the business firm—and more than two-thirds of it is determined by the transactions between consumers (whose behavior has been much studied) and business firms whose behavior and decision process until recently have been (relatively speaking) little studied—and this in spite of widely prevalent and at times emotional concerns with "bigness."

I would suggest that there are three principal reasons for managerial economics being a "few man's land" for so long. The first very important reason is of course that economists traditionally have been concerned with the big, broad problems of allocations of resources between nations, between industries, and between firms and between consumers, and with broad "big" questions of national policy rather than the allocating mechanism within the presumably unitary business firm itself. This concern is of course very important and proper, and nothing I or Professor Simon say about managerial economics or its importance in any way detracts from this fact. The second reason is that rapid progress awaited the development of high-speed computers and new mathematics and mathematical models largely conceived and initially developed in other contexts. But there is a third major reason which has particular significance for this meeting and this audience: progress was delayed because economists were such vigorous satisficers with their existing theories, and the barriers created by this attitude had to be broken down in favor of a more scientific, problem-solving approach to the world of the business firm.

The satisficing to which I refer was reflected in several ways. All too many economists for too long were wedded to given theoretical frameworks incorporating a certain traditional and limited list of presumably strategic variables in certain largely traditional ways and were too well satisfied with the adequacy of the restulting doctrines, "laws," or principles. This has been evidenced (even recently and even within managerial economics itself) by the great number of man-hours of some of our best minds in seeking increasingly sophisticated ways of rationalizing that the world "really" is not inconsistent with the logical implications of received doctrines rather than with the essential effort of a scientist per se to find out what forces are operating in what given specific contexts to produce the phenomena under investigation. Such determined satisficing has also been apparent in the efforts of many of our profession to look around to see what problems of operating decision-makers existing theoretical models would handle to a tolerable first approximation rather than seeking out what problems needed to be solved to advance the work of the world and to improve performance. And it has also, I would suggest, reflected an undue preoccupation within our discipline with equilibrium conditions rather than with the inequalities which, in even our simple traditional models, point the way toward improvement in any given context that is not already so good it cannot be improved (and how many of these are there how much of the time?). Equilibrium is simply the ultimate ideal in which all decisions (or, better, changes in action) which would make a given situation better have already been exhausted and taken. Two particularly glaring instances of this satisfaction with traditional models traditionally conceived has, of course, at least until recently, been reflected in the reluctance of economists to abandon static models in favor of a truly dynamic analysis and the companion reluctance to abandon models which assumed prescience in favor of those which information was itself an economic good and in which uncertainty was an inherent and explicit fact recognized within the analytical structure.

If I am correct that major progress came when economists per se ceased to be quite so satisficing about their own theories, this suggests that Simon himself must not satisfice too firmly with respect to the adequacy of behavioral, descriptive, scientific, or positive theories, and that in his own evolving aspiration level he will ultimately, if he has not already, recognize more fully and explicitly the importance of normative studies based upon behavioral simulations, and indeed of neo-Bayesian theory itself, in raising performance to the highest attainable, which is to say optimal, levels.

PROBLEMS OF ECONOMIC DEVELOPMENT

THE ROLE OF THE PRICE STRUCTURE IN ECONOMIC DEVELOPMENT

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The problem of the relation of the price structure to economic development is extremely complex. In the first place, the problem of deciding what are the relevant concepts of the price structure itself is by no means easy. We have the concept of the price set; that is, the list of prices of all commodities, including factors of production, as it exists at a moment of time. Even this is not a simple concept. A price is significant because it is an exchange opportunity. Where we have imperfect markets, the exchange opportunity is not necessarily described by a single price, although this presumably describes what might be called the marginal exchange opportunity; that is, the rate at which small quantities of the commodities can be exchanged. The significance of a price set, however, lies not merely in the exchange opportunities which it represents; it also lies in the behavior sets with which it is related. Thus, in ordinary equilibrium price theory, we assume that corresponding to each price set there is a set of shortages and surpluses of each commodity which is, in effect, a behavior set, for it represents the summation of a very large quantity of human behavior. Individual prices can then be labeled as "too high" if they correspond to surpluses and "too low" if they correspond to shortages. In equilibrium price theory it is presumed that a price which is too high in this sense will fall, thus tending to eliminate the surplus, and that a price which is too low will rise, thus tending to eliminate the shortage. There is, therefore, an equilibrium price set which corresponds to a set of zero shortages or surpluses. This is the essence of classical and neoclassical equilibrium price theory.

One complexity here is that the set function which relates the price set to shortage-surplus set may itself be dependent on the history of price sets in the past and on the expectation of price sets in the future. If we can suppose a constant relation between the history of the past and present expectations of the future, expectations can be eliminated from the system and we can merely suppose that we have an extended set function which relates the set of all price sets of the past to the set of shortages and surpluses in the present. Thus, we might suppose that if prices have been rising, then any given current price set will correspond to a shortage-surplus set in which there are more shortages and fewer surpluses than there otherwise would have been. The assumption that there is a constant relation between past history and present expectations, however, is almost certainly not justified, for expectations of future prices depend upon many other things than the mere history of past prices. There may, for instance, be general waves of optimism and pessimism which are derived from quite noneconomic sources and which profoundly affect the expectation of prices. This is a complication, however, which we must simply observe and then pass by.

There is not the slightest reason, however, to suppose that the equilibrium price set, in the sense of classical or neoclassical equilibrium theory, is the price set which will go with the maximum rate of economic development. We can postulate another set function in which each set of prices is associated with a given rate of economic development. This, again, may not be a stable function, as it may depend on a great many noneconomic factors; for instance, political confidence, religious movements, changes in social structure, and the like. As economists, however, we are accustomed to lumping these things in the category of "other things being equal" and for purposes of analysis it does not seem unreasonable to assume a given rate of development for each set of prices. The question is, therefore, what are the properties of such a set function, and to what extent is it reasonable to assume that the equilibrium price set in the classical sense is not the optimum from the point of view of economic development.

Some of the answers to these questions arise out of classical price theory itself. We are familiar, for instance, with the idea that the price set determines the distribution of investment among various industries and we are familiar also with the notion of external economies; that is, the idea that there may be a divergence between the social returns on investment in a particular line and the private returns. Where this is the case there is a strong argument for distorting the price structure away from what would be a market equilibrium by deliberately lowering the relative prices and hence discouraging investment in those industries where the external economies or the nonfinancial returns are small, and raising prices and encouraging investment in those industries where the external economies or the nonfinancial returns are large.

It is a fairly simple extension of this argument to argue that nonprice adjustments to shortages or to surpluses not only exist but may, under some circumstances, be preferable to price adjustments. There is no doubt, of course, about the extent to which these types of adjustments can be made. Suppose, for instance, that we have a nonequilibrium price set resulting in certain shortages and surpluses. In those commodities in which there is a shortage there will be no selling problem. Few resources will be devoted to advertising or to increasing sales, for as soon as any of the commodity is produced it is immediately snapped up by the market. Under these circumstances there is strong inducement to direct activity toward cost reduction. If this process goes on successfully, we may find that eventually the cost falls to where the price of the commodity is no longer too low and the shortage disappears. Similarly, if we have a commodity of which the price is too high so that we have a surplus, very little effort will be devoted to cost reduction and a good deal of effort will be devoted to expanding sales. Under these circumstances the demand for the commodity would increase, relative costs may rise, and eventually the price will no longer be too high and the surplus will disappear.

The evaluation of these non-price adjustments is extremely difficult. If, however, there is some tendency for a price set to be self-justifying in the sense that it will eventually create the conditions of demand and supply for which it is an equilibrium set, then we need to ask ourselves what is a desirable structure of relative prices? The answer to this may depend on what we think will happen to the structure of relative prices in the course of economic development. Thus the object of price policy for developing society should be to some extent to anticipate the price structure of the developed society and to create it artificially in the hope that it will turn out to be self-justifying. There are obviously sharp limitations on the extent to which this can be done, but this principle, we think, points out the direction in which an underdeveloped society will wish to distort its price structure. Jean Fourastié[1] has pointed out dramatically the extent to which economic development involves a radical change in the structure of relative prices. Economic development consists essentially in an increase in the productivity of labor. This increased productivity, however, is extremely unequally distributed among different occupations and commodities; hence, in the course of economic development, those commodities for which productivity has increased the most, suffer the largest fall in their relative price, whereas those commodities which have not enjoyed an increase in productivity find that their relative price increases substantially. Thus, in the course of economic development, window glass becomes cheap and haircuts become dear. Surprisingly little attention has been given by modern economists to this phenomenon which is masked by the generally macroeconomic approach that is taken to the problem of economic development. Development is not a mere proportional increase in the output of all commodities. It represents a highly radical change in the distribution of economic effort and in the mix of the total product. We are familiar with the fact, for instance, that it always involves a sharp decline in the proportion of the labor force engaged in agriculture, for one of the major sources of economic development is an increase in the productivity of agricultural labor. If the productivity in agriculture increases more rapidly than that in other occupations, we may reasonably expect to see a relative decline in the price of agricultural commodities. Thus, we do find in the course of economic development that there is a constant tendency for agricultural prices to be too high for long-run equilibrium and too low for justice.[2] In all developing societies, whether socialist or capitalist, we seem to find a squeeze on agriculture, and the relative price of agricultural commodities, that is, their purchasing power in terms of other goods, always seems to anticipate today an equilibrium value which it should have a decade or so hence.

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[1] Jean Fourastié, *The Causes of Wealth* (Glencoe, Ill.: Free Press, 1960).

A good economic liberal might now argue that we do not really need to worry about distorting the price system because the market does this for us. In the dynamics of development, the short-run equilibrium of the price system tends to anticipate what the long-run equilibrium will be and hence produces the non-price adjustments which will justify it. Thus, if we look at the purchasing power of agricultural commodities as a general symbol and an important element of the relative price structure, we shall find that if there is technological progress in agriculture this will automatically increase agricultural output and depress agricultural prices. Because of the fact that it takes time to get people out of agriculture, there are likely to be agricultural surpluses; that is, in terms of the short run, agriculture prices, low as they are, are still too high. Nevertheless, the fact that prices are low will force our efforts toward cost reduction in order to meet them.

We seem to be running into a real dilemma at this point. Assuming that economic development requires both a marked increase in the productivity of labor in agriculture and a large transfer of the resources so released out of agriculture, how do we accomplish both these ends at once by means of the price system? If agricultural prices are low, resources will move out of agriculture but, on the other hand, investment will not be made in it. If agriculture prices are high, investment will be made in it but resources will not move out of it. In American agriculture we have witnessed a spectacle which is no less remarkable because we take it for granted. We have had a long period in which we have combined both a great investment in increasing labor productivity and also a spectacular decline in the proportion of the labor force which is engaged in agriculture. One side of the coin is that we have reduced the proportion of the labor force in agriculture from about 90 per cent at the time of the Revolution to about 10 per cent today. The other side of the coin is that productivity has increased so much that whereas at the time of the Revolution the 90 per cent could barely feed the 100 per cent, now it only takes 10 per cent of the population to feed the whole. This combination of rising productivity and outward mobility, however, may be more of an accident than we like to think, or perhaps we should say, may be more embedded in the noneconomic aspects of society than we realize. Looked at purely from the point of view of the impact of the price system on economic development, we might easily visualize a system in which an initial improvement in agricultural productivity produced an immediate worsening of agriculture's terms of trade, that is, a fall in the relative price of agricultural commodities, which thereupon stopped all further investment in the increase of agricultural productivity. The society would simply move rapidly to a new level of equilibrium with slightly fewer people in agriculture and a slightly increased productivity, but there would be no continuing process because of the check to investment. It may well be, therefore, that the success of what might be called the "American Process" depends actually on a curiously perverse reaction to adversity.

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[2] A cost-reducing innovation is usually adopted at first only by part of the agricultural sector; there is, however, an increase in output and a fall in price. The price does not fall to the level which it would reach if the whole sector adopted the innovation; hence, is above the long-run equilibrium. The unimproved sector, however, finds itself in an income squeeze with its costs as high as before and prices lower. This is felt to be "unjust."

The difficulty here from the point of view of a general theory of social dynamics is that reactions to disappointment can be extraordinarily various and we do not know much about the circumstances under which we choose one rather than another. We can distinguish at least four reactions. There may be irrational frustration and anger leading to irrational acts which are not related to the problem. In the second place, there may be irrational apathy and withdrawal. The first reaction is, "to Hell with them"; the second reaction is, "to Hell with it." The third reaction is more rational, which is to intensify effort in the same direction as before. The fourth reaction may also be rational, which is to change the direction of effort. Thus, suppose we have made some kind of an investment, shall we say in increasing agricultural productivity, and we find the results disappointing because of its impact on the price system. We may become aggressive and join the revolution. We may become apathetic and sink back into traditionalism and indifference. We may decide to get out of agriculture altogether or we may decide to make still further investments in cost reduction and in increasing productivity. From the point of view of the economist, the system seems terribly indeterminate at this point. There is clearly an optimum combination which largely excludes the irrational reactions on the one hand, though a certain amount of this may be important as a safety valve and may actually be positively correlated with the rational reaction; that is, we may need an opportunity to blow off and to liquidate emotional residues before we can go on to rational action. Even if we concentrate on rational action, however, there is still an indeterminancy, and from the point of view of society there is probably some optimum combination of the two rational reactions; that is, some people ought to get out and change what they are doing and other people ought to stay in and redouble their efforts. It may, however, largely be a matter of luck in the society as to whether the optimum combination is achieved, and one probably cannot always rely on such a crude instrument as the price system to differentiate between these responses. The price system is simply a stimulus to which there can be more than one response. The differentiation among the responses, therefore, must be provided by other stimuli.

Institutional changes constitute a most powerful means of influencing behavior response. No specific structure of institutions can be recommended to tackle the initial task of raising agricultural productivity. It depends very much on the genius of the people, the socio-economic conditions of the country, and its traditions. In most Asian countries, such as India, where size of the farm is generally uneconomic, the co-operative institution is no doubt most suitable. Price policy can play only a limited role in encouraging such organization, for example, through discriminatory taxes, that favor its activities. The main burden of bringing about the organizational changes must, however, rest on the leadership of the country.

What this means, of course, is that any policy towards the price system must be placed in a matrix of other social policy. The price system merely specifies one set of opportunities and rewards for human action. Its effect will depend on the non-price opportunities and rewards. Its effect will depend, for instance, on the transfer system, such as the system of taxes and government expenditures which stands somewhat outside the price system, although it profoundly affects the price structure. The tax-expenditure system, as we know, affects rates of exchange between, say, human activity and goods or between goods which are taxed and those which are not. The general principle of the taxation of vice and the subsidization of virtue can be extended to include the taxation of those commodities the production of which we wish to discourage from the point of view of economic development and the subsidization of those the production of which we wish to encourage.

The "ideal" set of prices for economic development—and correspondingly the objectives of price policy—may differ widely as between countries which are well along the way and those which are just beginning their development from low levels. In the growth of the already developed countries, the inherent dynamic of the process may make it unnecessary to worry about the relative prices of those goods which are most important for the growth in the total output of the economy. In a newly developing country this may not be so. Certain traditional industries such as textiles, which contribute little to general development, may grow too fast, and some of the newer, strategic industries such as engineering, chemicals, and electric equipment too slowly. Strategic industries can be defined as those with the following features: the domestic or foreign demand for their products is expanding rapidly; there is great scope for increasing the rate of technological progress; and there are significant "linkage" effects upon other industries. In order to transform the economy in line with the potentialities of new activities, distortion of the relative price structure in favor of the products of strategic industries may become necessary.

The price structure can also be employed to manipulate the aggregate demand structure and also the distribution of income by restricting consumption in certain directions and encouraging it in others. Thus, there are a host of commodities and services consumed by the middle-class people, consisting of traders, shopkeepers and others, who derive substantial benefits, including windfall gains, from the process of growth; yet they are the people who typically are not called upon to make adequate sacrifice. The richer classes are generally subjected to high marginal rates of direct taxes; the middle classes often escape the rigors of direct taxation. Experience in developing countries shows that this class broadens quite fast in the initial stages and that their potential savings are often frittered away in higher consumption.

The prices of goods and services consumed by the middle classes should, therefore, be permitted and, in fact, encouraged to rise. In some cases of artificial or superfluous wants, there is a need for enforcing penalty prices. This change in relative prices would no doubt lead to an increase of the average price level, but it is justifiable if utilized to transfer resources from consumption to investment.

The benefits from rising prices, however, should not accumulate in the hands of dealers; they can be mopped up through turnover or excise taxes. The imposition of these taxes themselves will deter the flow of too large investment towards these industries that could be attracted by rising prices. If it is considered desirable to further check the expansion of certain activities because of other priorities, this can be accomplished through supplementary measures such as public issues control and industrial licensing. The point here is that a price policy, combined, of course, with suitable fiscal measures, is necessary to extract resources from the middle classes.

Public utilities such as railways and electricity undertakings could also reorient pricing policies. In the context of economic development, personal consumption should have a low claim on resources, and the static welfare criterion of equating price to marginal cost must recede in the background. Unfortunately, there is always a tendency to keep consumer prices undesirably low; the public enterprises are oversensitive to consumer hostility. Raising passenger fares and domestic electricity rates can prevent nonessential use of these services and help raise revenue for investment. The price structure here must be regarded as an integral part of the tax system.

In the case of commercial public enterprises, it would be a proper use of monopoly power to abandon unnecessary fidelity to costs and to make supernormal profits, provided that the pricing policy is not designed to screen inefficiency and that the surpluses are to be utilized for reinvestment. No uniform policy can, however, be laid down. In some cases of producer goods, produced by public enterprises, another criterion in terms of growth objective may have to be applied. A concessional price may be charged for certain equipments to encourage capital formation and technical innovations in the private sector. Later, surpluses in the private sector arising out of activities stimulated by such concessional prices can be mopped up by higher taxation. The whole question of public enterprise pricing needs to be examined in terms of growth criteria.

It must be pointed out here that certain critical goods, usually classified as consumer goods, the use of which has a profound influence on the dynamics of the society, have to be priced in a special manner. Paper, for example, may be subsidized because of its role in the spread of literacy. Bicycles increase mobility between urban and rural areas, and this factor cannot be ignored in considering the question of their relative prices. In such cases, price subsidies may be necessary to encourage "productive consumption." The household must be regarded as a productive as well as a consumptive organization, and inputs which increase its output should be encouraged.

Price policy can be a powerful instrument in yet another direction. It can be used to adapt technological changes to the factor proportions existing in the country. Underdeveloped countries, in fact, need a dual strategy in their choice of techniques: capital-intensive for the basic producer goods and such consumer industries as enjoy economies of large-scale production and labor-intensive for a variety of consumer goods and light engineering industries. Some authors have associated the process of development with the elimination of technological dualism. The expanding modern sector is seen as absorbing the so-called "backward sector." They believe that it is only the modern sector which generates substantial savings and investment.

Recent experience of countries like India shows that dualism is in fact an asset for development, and that the sector of small-scale industries, with its indigenous techniques, has a justifiable place in the economy. This sector consists of persons from various social classes and communities, but the most notable among them are artisans and craftsmen—men with native skill. They work in new types of engineering industries, such as those producing sewing machine and bicycle parts, hand tools, machine tools, agricultural implements, precision instruments, storage batteries, automobile parts, and a host of other items. There has been an upsurge of small-scale industry in certain parts of the country. In some cases every house has become a workshop. It is indeed an exciting experience—that fills one with hope for the future of the country—to see these hives that hum with industrial activity, the skilled, energetic, and creative men at work. A dormant force has come alive in the country. Obviously, the latent skill in these areas has existed for a long time, but it manifested itself only after political independence, when import restrictions and government programs created a propitious climate. The growth of these small industries is justified, not only on the basis of the factor-intensity criterion of investment, but for another, more profound reason. The growth of this sector of small industries taps a resource which is very scare in these countries; namely, entrepreneurship. Western economists sometimes associate this factor with a readiness to make dramatic and far-reaching innovations. For them it is, therefore, hard to conceive of these small industrialists working in their small workshops as entrepreneurs or even potential entrepreneurs. Dr. Lokanathan[3] has made the point that these persons represent an enormous potential force for the growth of industrial entrepreneurship. Small industry constitutes a seedbed for their growth. They have the ability to become entrepreneurs in the Western sense. They can rise to a medium level and some of them should be able to make transition even to large-scale entrepreneurs.

Small industry also mobilizes savings which would not otherwise have become available for productive uses. The entrepreneur provides a motivation for his friends and relatives to restrict consumption and lend their small savings in order to assist him in his venture. To the entrepreneur himself, the attraction of independence in his own business and the chances of growing richer provide an incentive to save. He leads an austere life to plough back his earnings for the expansion of his business. Without small enterprises in the picture, these resources would have been hoarded, might have gone into jewelry or have been spent on social ceremonies. Corporate securities or government bonds do not succeed in attracting them.

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[3] P. S. Lokanathan, "Supply of Entrepreneurs and Technologists with Special Reference to India," a paper presented at the International Economic Association Round Table in April, 1960, at Gamagori, Japan (printed by the National Council of Applied Economic Research, India).

Under Indian conditions, it is light engineering which has chiefly exhibited this interesting development. In other countries, depending upon the native skills of the people and the industrial potential of the economy, some other fields may show the same developments.

There are several fields in which small industry holds its place in the economy. Where demands are limited and specialized, such as those for surgical equipment and precision instruments and where requirements of design or specifications change so frequently as to require individual attention, small industry enjoys special advantages. In industries like those producing machine tools, there is such a wide variety of items and of sizes that the large-scale sector has to leave out custom-built products. Here, small industry faces little competition.

However, it is true that in most cases the small entrepreneur can rarely produce goods which rival in quality those manufactured by large-scale modern processes. But there are a number of fields where sizes and shapes need not be precise and where quality may be inferior but still acceptable. The important question is whether the goods are priced within the reach of the potential customers.

In such fields there is an economic case for subsidizing small industries through loans at concessional rates and cheap supply of various facilities like power and raw materials, so that the producers are able to maintain low prices and serve an expanding market. This would be a legitimate use of price policy.

Economists on the whole are prejudiced in favor of the use of the price system as against prohibitions and quantitative restrictions. The great advantage of a price system is that it permits the individual to adjust his behavior as an individual to a wide variety of choices. Prohibitions impose arbitrary behavior which may not be rational from the point of view of the effect of individual behavior on society. Prohibitions, furthermore, divert resources into evading them and they nearly always have a tendency to create windfall gains and losses which are meaningless from the point of view of economic motivation. Thus, if one wishes to discourage the import of luxury goods, for instance, it is usually much better to put a high tariff on them than it is to prohibit or to license their import. A general prohibition will prohibit legitimate as well as illegitimate behavior. A system of licensing and quotas creates windfall profits in the system to those who enjoy the license and, again, limits behavior quite arbitrarily. A negative-sum game develops also in which the administrator spends resources in building barriers and the administered spend resources in getting over them. A license is always a poor substitute for a liberty. From this point of view, therefore, the tax system is generally an admirable regulator if it is used wisely, though here, again, we have to keep our eyes on the problem of evasion and avoidance.

We may sum up, then, by affirming that in any given state of a society we can postulate an optimum price structure from the point of view of a stated goal of economic development. There are no easy formulas for defining the optimum and, indeed, the optimum itself may include a range of possible structures. Nevertheless, the very concept of such an optimum raises important questions and gives us at least a way of looking for the answers. There is no guarantee, for instance, that the Marshallian equilibrium price set is the same as the developmental optimum. Development requires a constant redistribution of resources, and the developmental optimum must clearly look towards the redistribution which is envisaged, with higher prices for the expanding and lower prices for the contracting industries. The developmental optimum price set, furthermore, is itself a function of the institutional and cultural patterns of the society. Our prejudice against quantitative restrictions arises out of the reflection that, though we may want to raise some prices and lower others in the interests of development, it would be surprising if the developmental optimum set includes infinite prices, which is what quantitative controls imply. If all that we seem to be saying is that particular prices should neither be too high nor too low, at least we emerge with the conclusion that infinite is almost certainly too high and zero too low, unless the goods are in fact totally absent or completely free. And we do point to the price structure as a powerful instrument for the redistribution of the activity of society along the lines of structural development.

LABORSAVING IN ECONOMIC GROWTH

By John H. Power
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When I accepted an invitation to present a paper to these meetings on the use and abuse of growth models, my intention was to classify as systematically as possible a variety of well-known models, and to attempt to suggest under what conditions each was or was not useful in illuminating the growth process. It soon became apparent, however, that the time and space limitations laid down called for something less than a general survey of growth theory. Consequently, I have decided to focus more narrowly on a particular aspect of modern growth theory that has been given less attention, I think, than it deserves; namely, the role of laborsaving.

Most versions of growth theory that are current appear to me to share an undue emphasis on the interrelation between capital and income, while neglecting the relation of capital to its complementary factors of production—especially labor. While the analysis of the interaction between investment and income is an important addition to our traditional ideas about growth, it has always seemed to me that it should assume central importance only when there are really unlimited supplies of labor; or, in a dynamic context, when the rate at which labor becomes available to tend new equipment exceeds the maximum rate at which saving permits net capital formation to take place. If this is not the case—if saving is not the principal constraint on growth—it makes little sense to concentrate on the interaction of investment and income, whether on a cyclical or a steady exponential path, while neglecting labor supply and laborsaving.

For underdeveloped countries, of course, the onesided emphasis on capital and income might be considered defensible, since it is commonly assumed that labor is a redundant factor of production. But redundancy may not be the same thing as available supply, and it is quite possible for this emphasis to lead to a neglect of the very policies —e.g., rapid improvement of agricultural productivity—which are required to convert a potential reservoir of labor into actual supply.

The neglect of labor supply seems completely misplaced, however, when applied to the growth problems of advanced countries. It is my contention that, except in unusual circumstances like recovery from war, or when there is a considerable backlog of unexploited new technology, labor supply is likely to be an important limiting factor in the growth of industrialized countries. I believe also that a failure to recognize this has clouded much of the discussion of the related problems of unemployment, growth, and inflation in these countries.

It is possible to give here only the briefest sketch of the model of dynamic disequilibrium at the factor level on which I base my argument. Nevertheless, it is essential for what follows.

There are two basic sources of disequilibrium in this model. First, the rate of capital formation may not match the full employment saving capacity of the economy. Second, the rate of capital formation may not match the rate at which labor is becoming available to combine with new capital, given techniques of production. To avoid both kinds of disequilibrium, the actual rate of capital formation must equal both the rate made possible by the saving function—the warranted rate—and the rate made possible by the supply of available labor—the natural rate. (I have attempted to stay as close as possible to the spirit of Harrod's nomenclature, though his are rates of growth of output, while mine are rates of capital accumulation.)

It is possible, of course, that the actual rate could depart from both warranted and natural rates when the latter two are equal to each other; but this would so greatly simplify the problem of achieving equilibrium growth that the case is not very interesting. Consequently, I put the condition for avoiding disequilibrium as equality between the warranted and natural rates of capital formation. Rather than discuss the characteristics of equilibrium growth, however, I want to focus on the two kinds of disequilibrium implied by inequality between the two rates.

First, however, I must say an additional word about the natural rate. There are two elements here: the number of workers who are available in each period to combine with net increments to the capital stock and the ratio of capital to labor at which they are equipped. I take the latter as determined by knowledge and factor prices. The former—the labor supply element—includes not only actual increments to the labor force but also those technologically unemployed by laborsaving. If the capital-labor ratio is rising, a given stock of capital continuously requires fewer workers, so that the displaced labor is available for (and requires) net capital formation. The rate of laborsaving is, then, the rate at which the over-all capital-labor ratio is rising; and it is this rate plus the rate of growth of the labor force that, together with the capital intensity of new investment, determines the natural rate of capital formation.

Note that laborsaving is measured by the labor saved for a given stock of capital—not for a given output as in the case of Harrod's natural rate of growth. The two are the same if the capital-output ratio is constant; since if the latter is given, as Harrod assumes, the capital-labor ratio must have risen precisely in proportion to the rise in labor productivity. Otherwise—if the capital-output ratio is not assumed to be constant—each independently has a directly opposite influence on growth disequilibrium. Rising labor productivity increases saving without raising investment requirements; and a rising capital-labor ratio raises investment requirements without increasing saving.

Note also that the over-all capital-labor ratio can rise either because laborsaving innovations are occurring generally throughout the economy or because the proportion of labor employed in the more capital-intensive sectors is increasing. In fact, the rise in the proportion of labor employed in industry at the expense of agriculture is probably the most important source of laborsaving during the course of economic development.

When the natural rate of capital formation exceeds the warranted rate, the alternatives are unemployment (perhaps disguised) and inflation of the inflationary gap type, or some of both. For an actual rate of capital formation at the natural rate means that investment exceeds full employment saving; while an actual rate equal to the warranted rate means failing to equip, or underequipping, a part of the labor force. This kind of disequilibrium, I suggest, is typical of underdeveloped countries, which usually exhibit as symptoms of growth disequilibrium, shortage of capital, unemployment (or underemployment), and excess demand inflation of the classical sort.

Curiously, in the opposite case of disequilibrium—when the warranted rate exceeds the natural—the alternatives are also unemployment, inflation, or some of both. But unemployment here stems from an inability to sustain investment at the rate warranted by the saving function—i.e., from deficiency of aggregate demand—not from an inadequacy of saving. And inflation results from the attempt to cure unemployment by pushing investment to the warranted rate; since such a rate cannot long persist without making the underlying dynamic labor scarcity explicit, while the lower is unemployment the stronger are the pressures for wage-price inflation (the familiar "Phillips-curve" relation). The alternation between Keynesian unemployment and wage-price inflation in advanced countries is, I suggest, evidence of this kind of disequilibrium.

Thus both cases pose the dilemma of a choice between unemployment and inflation. Yet the similarity of the symptoms is entirely superficial. Unemployment and inflation reflect precisely opposite kinds of structural disequilibrium in the two cases. Correspondingly, they call for completely opposite remedies. When the natural rate is the higher one, what is required is some combination of slower population growth, less capital-intensive methods, and more saving. These we traditionally associate with lower real wage rates and higher interest rates. It would perhaps be not entirely misleading to call this the classical case.

When it is the warranted rate that is higher, the remedies are more capital-intensive techniques, or less saving, or both (leaving more rapid population growth aside, as at best a make-work remedy). And these we traditionally associate with higher real wage rates and lower interest rates. This I suggest we call the Keynesian case.

I pass over the relation of growth disequilibrium to business cycles, as well as the possibility of endogenous equilibrating adjustments in factor proportions, since I have dealt with these at length elsewhere. I will say only that, in my opinion, there is neither dynamic instability in the sense of a tendency toward further departures from equilibrium, nor dynamic stability in the sense of natural movements toward equilibrium in either case. Rather, both seem to represent rather stable cases of viable disequilibrium. For in the classical case the surplus labor can usually find semiemployment in agriculture or services, and these semiemployed eventually become difficult to move into full employment even with the aid of vigorous social policies.

In the Keynesian case, the underlying shortage of labor never becomes explicit in the market, even in booms, because prices rise easily with wage costs. Furthermore, the monetary authorities, wrongly diagnosing the inflation as the classical variety, help to bring the boom to an early end, thus ensuring that, via the ensuing drop in income, saving which would otherwise be surplus instead disappears and labor that would otherwise be scarce becomes redundant.

But what is it that places an economy in one or the other of the two categories of disequilibrium? And, if the symptoms are similar, how does one identify the kind of disequilibrium that is present? Finally, is it legitimate, as I have suggested, to relate this distinction to the degree of development—underdeveloped countries representing the classical case and advanced countries the Keynesian case?

It is not uncommon for the rate of population growth to be higher in the early stages of industrial development than in the later. Moreover, for two reasons the rate of laborsaving is also likely to be higher in the early and middle stages of industrialization. First, and most important, is the steady rise in the proportion of the economically active population engaged in manufacturing at the expense of agriculture. In addition, the backlog of industrial technology open to imitation provides vast potentialities for laborsaving. But when an economy has largely accomplished the shift from agriculture to industry, when it is on the frontiers of technology, and when it is the services sector that is expanding most rapidly, the rate of laborsaving may be very much lower.

While the ratio of capital to labor at which new investment takes place will be lower in the early stages of development, it will at the same time probably be higher than it should be, given the labor supply situation and saving capacity. And it is the latter—the capacity of a given population to save—that most clearly distinguishes the underdeveloped from the developed economy.

Thus I would conclude that there may be a natural evolution in the process of a country's development from the classical kind of dynamic disequilibrium toward the Keynesian. It does not follow, however, that we can always, without exception, place newly developing countries in the classical category and advanced countries in the Keynesian. Let me suggest examples of exceptional cases.

Ricardo and Malthus, in their debate over the possibility of a general deficiency of demand, both accepted the premise that in the short run, before the Malthusian law of population could operate, there would be a tendency for capital accumulation to proceed more rapidly than the growth of labor supply. If they were right, the implication is that Great Britain, even at this early stage, occasionally exhibited the characteristics of Keynesian disequilibrium. And this seems reasonable simply because Great Britain was the initiator of industrial development, and the initiator does not enjoy the luxury of cheap laborsaving through imitation of advanced techniques developed elsewhere.

Today's newly developing countries can, in contrast, tap a vast reservoir of laborsaving technology, so that Keynesian difficulties should not occur for a very long time. The principal danger is, of course, that they will attempt to laborsave too rapidly in industry, thus accentuating their capital shortage.

Nevertheless, as I have already suggested above, there is a great difference between having a reservoir of underemployed labor and mobilizing it to tend capital equipment in new industries. To convert this potential into actual laborsaving usually requires some kind of reorganization of agriculture, but, in any case, a substantial increase in agricultural production.

This is made more difficult if there is great pressure of population on land. I have never inclined to the view, sometimes expressed, that it is an advantage to have a labor force in agriculture with zero marginal productivity (pure disguised unemployment). It is under these conditions that it is most difficult to achieve the required surplus in agricultural output. For it is likely that average productivity will be lower when marginal productivity is lower. The most promising case for laborsaving via shifting labor out of agriculture into industry is when land is abundant in relation to labor, not scarce. In this case what makes the shift desirable is not so much a difference in labor productivity in the two sectors, but the difference in the income elasticities of demand for agricultural and industrial products.

The Soviet Union, incidentally, is a good example of a country whose growth rate in the near future might depend very heavily on laborsaving out of agriculture. Though faced with an imminent labor supply problem, agricultural workers apparently still constitute more than 40 per cent of the total Soviet labor force. Obviously much will depend on the success of the agricultural programs in freeing labor for continuing industrial growth.

A very important exception to the generalization that advanced industrial countries tend to exhibit Keynesian symptoms is the recent remarkable performance of some of the economies of Western Europe. I think that it is impossible fully to understand this phenomenon without focusing on the laborsaving element in this process, and the reasons behind it. My own view is that the very rapid increase in the capital stock in relation to labor supply that has occurred was made possible by a process of catching up to advanced technology and by a rising proportion of the labor force employed in the more capital-intensive sectors. If this is true, then it is no mystery why neoclassical fiscal and monetary policies have worked so well and Keynesian prescriptions have not been needed. The Keynesian kind of disequilibrium has been avoided through a sharp rise in the natural rate of capital formation.

Some economists who know the situation there far better than I seem to feel that there is no reason for this pace of growth to retard in the future. I almost get the impression that they believe that laborsaving opportunities are endless, and that if an economy is flexible and responsive to opportunities only the warranted rate of capital formation—i.e., saving—can limit the rate of growth.

My own contrary view is that what has been going on is a combined catching-up and reorganization process and that this cannot be repeated endlessly. When the catching up is over, it is the frontiers of technology that must be moved more rapidly in order to sustain the pace of growth.

The West German case requires a special comment. In addition to rapid laborsaving, there was a phenomenal increase in the ratio of employed persons to total population (in contrast to France where the ratio declined). Since both of these factors on the labor supply side are probably nonrepetitive, it is likely that West Germany will exhibit more Keynesian tendencies in the future, especially if it attempts to maintain its topheavy income distribution and high rate of saving.

But there are other possibilities for Germany that are suggested by the approach to growth theory I have outlined. Ordinarily we think of an export surplus as inflationary and an import surplus as disinflationary. This is true, however, only for countries that find themselves in the classical kind of disequilibrium. If a country is instead faced with a warranted rate in excess of its natural rate, the accumulation of foreign assets helps the economy to invest at the warranted rate—i.e., solve the short-run Keynesian problem—without putting pressure on labor supply and risking wage-price inflation.

A more promising approach to the problem of sustaining growth in West Germany would be the implementation of trade liberalization in agricultural products in the Common Market. This would undoubtedly force a more rapid pace of laborsaving out of German agriculture, thus raising for a time the natural rate of capital formation.

I will conclude with a comment on growth in the United States. I suggest that those who play the game of growthmanship here may be making the mistake of treating the warranted rate rather than the natural rate as the limit to growth. For it is easy to calculate a 6 per cent growth rate on the basis of the reasonable assumptions that we are capable of saving 15 per cent of net national product and that the marginal capital-output ratio is not more than 2½. But with a labor force expected to grow at about 1½ per cent per annum in the coming decade, there is a gap of 4½ per cent for laborsaving to fill. (I am assuming a roughly constant capital-output ratio.) This is about three times the average rate of laborsaving of the past eighty years and more than double the highest rate achieved in any one decade in that period. Of course there is slack in the economy. But once the slack is taken up, what is needed is a revolutionary rise in the rate of laborsaving to sustain growth at the warranted rate.

THE DEVELOPMENT OF ENTREPRENEURSHIP*

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Discussion of economic development, since the revival of interest in the late forties, almost invariably starts with the acknowledgement that economic growth depends on a complex of interrelated factors. With this out of the way, the tendency is to focus on a single key factor—not the only, but the most important, determinant of growth. The emphasis at various times and by various authors has been on technical knowledge, ideological fervor, natural resources, governmental organization, motives and attitudes, and capital. Emphasis has recently shifted to the key role of decision-making innovators, particularly in industry—in a word, entrepreneurs.

Past and Current Views of Entrepreneurship

Stress on the importance of entrepreneurs hardly qualifies one as an innovator in economics. Writings old and new agree not only on this importance but also on five other propositions:

1. The industrial entrepreneur is a distinct personality type. At the least, he must believe that change is possible and can be brought about by individuals, and he must be motivated to action bringing it about.
2. Within any society only a limited number of individuals have entrepreneurial attributes in sufficient degree to be actual or potential entrepreneurs.
3. These individuals do not act entirely or even primarily from pecuniary motives. For instance, they may try to achieve recognition in the economic sphere because other avenues are not open to them.
4. A significant number of them will turn from potential to actual entrepreneurship only if the noneconomic obstacles they face are not too severe. Among such obstacles are lack of security for person and property.
5. Entrepreneurs must be able to obtain command over resources by obtaining credit or by other means.

To these propositions, much of the recent discussion of entrepreneurship and development has added others, with wide implications:

1. Potential entrepreneurs are not randomly distributed in societies, as suggested by Schumpeter's analogy with the ability to sing. Instead,

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* This paper is a highly condensed and compressed version of part of a forthcoming study on government and private enterprise in the development of Pakistan.

entrepreneurial characteristics develop in a significant number of people only from a change in the motives of a society or of a substantial group in it.

2. Such a change in motives results only from fundamental alterations in a society. Changes in economic incentives or disincentives are neither a necessary nor a sufficient condition.

3. The required alterations have not yet taken place in many underdeveloped countries; they are likely to come about slowly and uncertainly; they are difficult to influence or accelerate by conscious government policy.

4. Such industrial entrepreneurs as do exist find it difficult to obtain command over real resources, in the absence of ideological imperatives—such as the Protestant or the Communist ethic. In underdeveloped countries the propensity to consume is high, and such savings as do take place are used for inventory speculation, other short-term commercial ventures, and investment in agricultural land, in urban real estate or abroad. These preferences affect not only landlords and commercial groups but even the few industrial entrepreneurs, since both consumption and nonindustrial investment are prestigious, involve less risk, trouble, technological knowledge and above all less change in habits and customs than does industry.

These propositions, stressing psychological factors and largely ignoring economic ones, are implicit in much of the recent discussion of entrepreneurship and economic development.

Everett Hagen, in a book to be published shortly, argues that the emergence of a substantial number of entrepreneurs depends on the suppression of a previously prestigious group and the slow changes in personality this brings about rather than on changes in economic environment.

A. O. Hirschman in the *Strategy of Economic Development* concludes that *the* scarce factor in development is the ability to make decisions. In underdeveloped countries change is considered possible either only at the expense of others, or only if a whole group changes. In either situation, individual ability to make entrepreneurial decisions is severely limited. Development programs and policies must, therefore, maximize induced or routinized decisions.

David McClelland in the *Achieving Society* has accumulated impressive documentation for his thesis that the development of entrepreneurship depends primarily on the strength of a clearly defined psychological variable—the need for achievement. This in turn depends on child-rearing practices, which may be affected by changes in ideology or other factors.

Ragnar Nurkse and J. J. Spengler suggest that enterprise and initiative have come largely from the middle class, which is virtually nonexistent in underdeveloped countries.

A number of policy conclusions have been derived from the assumption that the genesis of enterpreneurship is primarily a slow psychological phenomenon. One conclusion, frequently drawn, is that industrialization depends very largely on government funds and government sponsorship. It will, in any case, be difficult to carry out because the entrepreneurs to make the diffuse decisions required will not be available and therefore emphasis needs to be placed on programs where change is more directly in government hands. Furthermore, many government policies can only be implemented by the use of direct physical controls, since the response to indirect price incentives will be inadequate. In any case, direct controls have few undesirable consequences, for even without their inhibiting effects few effective entrepreneurs will emerge. Another policy implication is that the ability to absorb foreign aid is limited by the absence of entreprenuers to use the capital and technical assistance supplied. One could list other conclusions with respect to research needs, government policies and analysis that follow from the view of entrepreneurship explicit or implicit in much of recent literature, but those listed should suffice to demonstrate the far-reaching consequences. To what extent is this view not only logically plausible but also empirically accurate?

Testing Hypotheses in Pakistan

Pakistan is a good country for testing hypotheses on industrial entrepreneurship, since it had little industry, even for an underdeveloped country, at independence in 1947 and has since experienced an extremely high rate of industrial growth. Except for a few traditional enterprises in the simple processing of agricultural products, practically all industrialists are enterpreneurs in the Schumpeterian sense, innovators who set up industries not previously in existence, with factors not previously in industry, to enter markets not previously supplied from domestic production—all under rapidly changing circumstances. The background, characteristics, and sources of finance of the men who were responsible for the rapid industrial change of the last ten years should throw considerable light on the genesis of entrepreneurship in Pakistan and perhaps elsewhere.

To obtain the necessary data, lengthy interviews were held with a stratified random sample of over 250 industrialists throughout Pakistan and all its industries. The results were checked against other data. Several checks for internal consistency were included in the interview. The sample covered nearly 10 per cent of all firms with about 50 per cent of the capital of Pakistan's industry. It included the industrialists who control some 75 per cent of the capital. The sample and this paper exclude firms not using power or employing less than twenty workers. This is a serious drawback only in some respects. In general, firms below these limits are traditional enterprises, occur only in a few industries, are likely to play a rapidly decreasing role, and do not involve entrepreneurship in the Schumpeterian sense.

The results inevitably have a substantial margin of error due to inadequate records and biased responses. Only gross differences are, therefore, significant. All subsequent figures are derived from the preliminary results of the survey, usually expanded to represent the universe, unless otherwise noted.

The development of Muslim industrial entrepreneurs in Pakistan has proceeded at a phenomenal rate. In prepartition India, Muslims were traditionally peasants, landlords, soldiers, artisans, and, to some extent, government employees. Only a small proportion engaged in trade and an insignificant number were in manufacturing, other than in small or handicraft enterprises. In 1947, industry (firms using power and employing at least twenty workers) contributed about 1 per cent to national income in Pakistan and more than half of this was controlled by Hindus, government or foreigners. Yet by 1959, industry's contribution to a much larger national income was over 6 per cent. Industrial assets had increased ninefold and value-added more than tenfold. Private firms owned by Muslims controlled two-thirds of these assets.

Even these figures do not fully reflect the radical change that took place, since potential industrial investment exceeded actual investment. Investors have applied to the government for permission to set up new industries and to import machinery in amounts that consistently exceeded available foreign exchange. They have applied pressure, offered bribes, and were willing to pay a legal surcharge of over 100 per cent to import machinery. Investment plans of existing firms would result in more than doubling 1959 industrial assets over the next three to five years. Investment plans of several firms each involve the equivalent of 20 million dollars or more.

Much of the early investment was in cotton and jute products, but by 1958 about 20 per cent of investment was in such long-gestation-period, capital-intensive, or complex-technology industries as chemicals, paper products, cement products, machinery and assembly or manufacture of transport equipment. More signficant, investment plans were heavily concentrated in these lines.

There is thus considerable evidence that in the span of roughly ten years, the Muslims of Pakistan developed a vigorous entrepreneurial group. They did so, at least in part, in response to strong economic incentives and disincentives.

The Development of Entrepreneurship in Pakistan

At independence, vast opportunities for Muslim traders—especially in importing—opened up because of the separation from Indian industry, the exodus of Hindu traders, and the limited role of foreign ones. With the Korean boom, export profits increased with rising international prices, much larger imports could be financed and some importers/exporters began to deal in substantial sums and to accumulate large profits. Some traders invested their trade earnings in industry, especially if they already had some investment or experience in it. With the end of the Korean boom came a dramatic change in the situation—export earnings declined sharply, imports in some lines practically disappeared, and opportunities for profit in domestic industry greatly increased. Other traders now shifted resources from trade to industry. At the same time, it became increasingly difficult to import the machinery and other items required for investment; and only the more energetic and ruthless were in a position to become industrialists or to expand industrial holdings.

Almost any industrialist was guaranteed a profit, for imports offered little competition, domestic production was inadequate, and those able to import machinery were subsidized by undervalued foreign exchange. In some industries, annual returns of 100 per cent on investment were usual. For a number of reasons, the bulk of industrial profits were reinvested. Government was able to prevent large-scale illegal transfers abroad. Consumption was discouraged by the inadequate supply of imported or domestic luxury goods and building materials, by traditionally limited wants, by some feeling against conspicuous consumption, and, above all, by the desire to reinvest earnings while profits were high. Industrialists had little urge to invest in agricultural land, partly for fear of land reform, partly because the ex-traders earning high profits had not done so for two or three generations. Investment in urban real estate was limited by shortages of building materials and perhaps even more by greater and equally certain profits in industry. Import regulations discriminated in favor of investment goods. As a result of all these factors, most firms invested in industry, not only a large share of great industrial profits, but also generous depreciation allowances, management earnings, and legal and illegal trade profits.

The commitment to industry was not reversible. The rate of return has declined in the last few years, with the increase of domestic competition, some easing of import restrictions, and more effective enforcement of tax and other laws. Nevertheless, investment has continued to be vigorous. The desire for industrial investment has continued to exceed foreign exchange availabilities. Investment plans indicate no flagging of entrepreneurial spirit. Ninety-six per cent of the children of present industrial decision-makers are expected to enter industry.

The lower returns in some industries have stimulated interest in investment in other industries—and in efficiency. The entrepreneurs had always relied heavily on foreign technicians to set up plants and initially run them. At least 60 per cent of the investment in larger firms involved some foreign technical staff. Entrepreneurs thus had overcome the limits on expansion that lack of technical manpower would otherwise have imposed. But, until recently, most of them were little concerned with efficiency. This was sound profit-maximizing behavior, since the returns from increased efficiency were likely to be less than from the promotion of new enterprises and from coping with and trying to evade government regulations. As profits fell, as competition increased, and as laws were better enforced, efficiency received more attention. The trend is from family management to professional management and toward the employment of technical staff regardless of family or "community" connections. The more promising young family members are receiving training in engineering and sometimes business administration. By 1959 at least one-quarter of the investment in larger firms was controlled by families who had provided or planned a technical education for some members. In short, in a period of less than a decade, the robber barons and promoters of early industrial development are beginning to give way to the organization men.

Some Quantitative Evidence

Evidence that this description of the process at least approximates reality is given in the following tables.

The rapid growth in industrial assets, accelerated by the Korean boom and even more sharply by its end, would be even clearer in Table 1 if industries owned by Hindus, the government, and foreign-

TABLE 1

GROWTH IN INDUSTRIAL ASSETS

	Crores*	Index
1947	58	17
1949	82	23
1951	128	36
1953	203	57
1955	351	100
1957	436	124
1959	502	143

* One crore rupees is roughly 2 million dollars.

TABLE 2

REASONS FOR ENTERING INDUSTRY

(Numbers of Firms)

	All Firms	Larger Firms*
Family or individual in industry before	25%	16%
Poor prospects for trade	25	45
Expected profits	27	14
Incidental to trade (e.g., jute baling)	5	6
Industry superior; patriotism	9	5
Government policy; accidental; other	10	14

* Capital $200,000 equivalent and over.

ers were excluded. They accounted for over half of industrial assets in 1947 and only one-quarter in 1958.

Entrepreneurs overwhelmingly indicated pecuniary motives for entering industry. Ex post facto explanations are not always reliable, but any bias in this case is more likely to lead to stressing of altruistic than profit motives. Table 2 also lends support to the thesis that many traders, especially those who are larger industrialists now, were pushed out of trade by declining profit possibilities or attracted to industry by increasing ones. Responses in these two respects are biased downward, since many traders with industrial sidelines in 1947 did not indicate why they shifted resources from trade to industry, but only that they had already been in industry.

Persons whose primary occupation before 1947 (or before entering industry, if this was later) was trade, furnished almost half the entrepreneurs for Pakistan's industry. They set up the larger or more rapidly growing firms and now control nearly 70 per cent of capital. On the other hand, individuals in small industry or handicrafts before 1947 have mostly remained small industrialists. Although 18 per cent

TABLE 3

INDUSTRIALISTS OCCUPATIONS PRIOR TO 1947 OR TO ENTERING INDUSTRY (IF LATER)

	PREVIOUS PRIMARY OCCUPATION		PREVIOUS SECONDARY OCCUPATION		FATHER'S OCCUPATION
	Proportion of Industrialists	Present Investment	Proportion of Industrialists	Present Investment	Proportion of Industrialists
1. Large and medium industry	17%	16%	4%	30%	8%
2. Small industry, handicrafts	18	6	23	7	17
3. Traders—import, export	17	40	30	25	12
4. Traders—internal	28	29	39	24	34
5. Employees, professional, other	16	6	4	12	16
6. Agriculture	3	3	—	1	12

TABLE 4

SOURCES OF FINANCE FOR INDUSTRY

	Crores	Per Cent
Prepartition industry (Pakistan and India)	27	5
Import trade	31	6
Other trade—export, internal, government suppliers	41	8
Agricultural land (and real estate)	10	2
Government and semigovernment; equity and credit	66	13
Foreign (including India)	21	4
Commercial banks, other creditors	64	13
Other (employment, professions, transport, religious, scattered shareholders)	20	4
Industrial earnings reinvested in the same or new enterprises	221	44
Total	501	

of present industrialists were from this background, they control only 6 per cent of capital at present. A large proportion of all entrepreneurs had fathers and grandfathers in trade. Trading was their traditional occupation and a change to industry was an entrepreneurial decision.

The very small total of industrial assets in Pakistan in 1947, plus proceeds from industrial assets disposed of by Muslims in India (5 per cent), indicates the insignificant role of Muslims in industry. Government investment includes railway and other workshops, credit institutions whose contributions were of little significance, and about 33 crores of investment by a semigovernmental corporation which played an important pioneering role in the fifties in some industries and geographic areas. Trade profits were crucial for starting private industry, but expansion was supported by reinvested earnings. Excluding government and foreign funds, reinvested earnings provided over half the capital invested by private indigenous enterprise in about ten years. Clearly both profits and reinvestment rates were high.

The evidence in all the tables would be further strengthened if they excluded small firms, traditional processing industries (tea, jute and cotton baling, etc.), and firms set up in the late fifties when several landlords became industrialists. Earlier, larger firms in new industries were generally set up by former traders, who obtained capital from their trade earnings and from reinvested profits. Some of these traders had had industrial holdings as a sideline. (The only significant exceptions are in the metal working industries, where there was some tradition of Muslim participation before 1947.) Traders, unlike landlords, artisans, or employees, were accustomed to buying and selling, to employing others, and to contracts, though mostly on a small scale. In short, they were operating in a market economy and responding to economic incentives. Given an opportunity to expand greatly their trading operation, the more energetic seized it. Later they were suddenly faced with a sharp loss of income and scope if they continued in their accustomed occupation, but could make large profits at little risk in industry. However, to a large extent only those with some foresight, ability, and ruthlessness could make the shift in the face of various obstacles. It is really not surprising that these economic incentives and disincentives called into existence a new, able, ruthless group of industrial entrepreneurs. What is more startling is the speed with which traders became industrial entrepreneurs and with which they became accustomed to this role.

The Social Background

If firms owned by foreigners, Hindus, and government and semi-government agencies are excluded (one-third of the total), over half of industry is controlled by five small "communities" (quasi-castes) of traditional traders, totaling about one-half per cent of the population. Perhaps another quarter of investment is also in the hands of members of traditional trading communities. On the other hand, groups which had little experience with trade or industry, such as the Muslims of Bengal, are underrepresented among industrialists to a startling extent.

TABLE 5

DISTRIBUTION OF MUSLIM INDUSTRIAL INVESTMENT AND POPULATION BY "COMMUNITY"

Community	Industrial Investment	Population*
Halai Memon	27%	0.3%
Chinioti	9	0.05
Dawoodi Bohra	5	0.04
Khoja Ismaili	5	0.1
Khoja Isnashari	6	0.04
Bengali Muslim	4	50.0
Other Muslim	44	49.0

* Estimates of community membership very rough. These figures and most information on trading communities from Hanna Papanek, "The Khoja Ismailis of Karachi" (unpublished).

Though about three-quarters of industry is in the hands of members of traditional trading communities, these groups have little else in common. (Legend has it, however, that when the great majority of present-day Muslims were converted from Hinduism, these communities were converted from trading castes.)

The more significant of them (Memon, Chinioti) are Sunnis, the majority division among Muslims, and are distinguished primarily by geographic origin. Most of the groups are only economic innovators, not social innovators; they have followed their own tradition in social customs and religious observance, including the attitude toward education and the role of women. None had a large investment in industry before 1947 and all derived their income primarily from trade. What evidence exists does not suggest that these groups had high status in the past; on the contrary, they were traders and stood midway in the social hierarchy. There is no evidence of any sharp change in their attitudes, motives or child-rearing practices in the period before 1947. Conversation with them indicates no strong feelings of nationalism. As a matter of fact, less than 10 per cent of all industrialists suggested any nonpecuniary motives for entering industry (including patriotism, nationalism) and one might assume that there is a strong upward bias in such a figure. While partition of the Indian subcontinent meant a change of domicile for many, it uprooted very few from a traditional environment. Most had left their native town or village earlier to trade in the cities. At least in the case of the two communities most important in industry, there was no selective migration to Pakistan. Chiniotis originate in present Pakistan; entire townships of Memons left India after partition. The only obvious major change that took place in 1947 was in the economic environment: the sudden increase in economic opportunity.

It is not surprising that a few trading communities took advantage of increased opportunities while the bulk of Muslims did not. Among Indian Muslims few except traders were primarily market oriented. They were a small fraction of the Muslim population and most of them belonged to trading "castes" or "communities." Ascriptive community membership facilitated the change from trade to industry, because others from the community were more trustworthy as partners, assistants, managers, technicians, and accountants. Fellow community members might also provide funds, scarce materials, knowledge, and influence. Most Muslim trading communities have participated in industrialization. They were the first to respond to increased industrial opportunities as the result of their market orientation, the support provided by community membership, and the sharp curtailment of their customary trading activities. Other groups were not exposed to the same incentives. The peasants produced primarily for subsistence or barter. Artisans and operators of small workshops often disposed of their products through traditional arrangements with employers or merchant-traders and were not directly in touch with the market. Their opportunities increased little with partition, since few of their competitors were Hindus. They did not obtain either the great capital resources or the experience with large operations of the traders who participated in international trade after 1947. The economic opportunities and social status of landlords, civil servants, and professionals were improved greatly by the Hindu exodus and they had little incentive, therefore, to try new industrial ventures. However, landlords have entered industry in larger numbers recently, when land tenure reform became a real possibility.

Conclusions

Conclusions should not be drawn from Pakistan's experience without an explicit recognition of some favorable noneconomic conditions that existed in Pakistan and that may be necessary for the development of entrepreneurship: (1) a government and civil service able to maintain law and order, to prevent massive capital flight, to enforce import controls, and to provide reasonably adequate overhead facilities; (2) at least a very small proportion of the population accustomed to responding to market incentives; (3) a value system and institutions that were not so hostile to entrepreneurial activity that only a strongly deviant group would be prepared to undertake it; (4) a political system which did not collapse despite high prices to consumers, high profits for industrialists, and the presence of many foreign technicians. Given these conditions, there is considerable evidence of a rapid development of industrial entrepreneurship in response to powerful economic incentives—whatever may have been the deeper motives satisfied by economic rewards. In a decade, a country with little industry and few industrialists has achieved a vigorous industrial development, limited primarily by inadequate foreign exchange. Many of the new industrialists came from families of traditional traders, but in a few years seemed committed to industry, no longer in need of strong economic stimuli, and ready to pay more attention to efficiency. There was no evidence that they were innovators in noneconomic matters, that they came from suppressed groups, that they differed from other Pakistanis in child-rearing practices or extent of nationalism.

The high rate of industrial growth was sustained from reinvestment of a very large proportion of all earnings. At least part of the explanation for this lies in the high rate of returns expected and the limits placed on consumption by import and other restrictions.

This discussion of Pakistan does not analyze social change which took place before 1947, and particularly the mechanism by which various groups originally became responsive to market influences. However, with respect to the shift from other market activities to industrial entrepreneurship, Pakistan does not lend support to the propositions earlier suggested as reflecting much recent work. It is difficult to interpret what happened in Pakistan in terms of a slow, fundamental change in motivation, or in ideology, or in customs, which then caused alterations in economic behavior. Instead, changed economic incentives were effective in altering economic behavior, given specified favorable noneconomic circumstances.

To generalize from Pakistan's experience for all underdeveloped countries would be tempting, but not justified.

First, other countries may not have in the same degree the four noneconomic conditions suggested as necessary and as existing in Pakistan.

Second, there undoubtedly are other noneconomic factors, which, in other countries and under other circumstances, would be important and might be crucial. A tribal society, with communal ownership, might not develop industrial entrepreneurs even if some of its members are involved in the market on behalf of the group. In the absence of careful study, one must also concede a possibility that even in Pakistan other noneconomic factors, including changes in the Muslim society of India, were more significant for entrepreneurship than here suggested.

Finally, the economic incentives and disincentives making for industrial entrepreneurship will often not be as clear and strong as they were in Pakistan.

Perhaps the recent stress on noneconomic factors in the development of entrepreneurship derived implicitly from societies that did differ from Pakistan in these respects. A primitive society with few market transactions would need to experience fundamental changes before a number of people respond to market incentives. Even in more sophisticated societies, the shift from traditional activities to industry does require strong incentives. Where powerful economic incentives are absent and social obstacles are great, industrial entrepreneurs may not develop in substantial numbers unless either the social obstacles are reduced by changes in the society or a deviant group is willing to surmount them for moderate economic rewards. This may well have been the situation in many countries in the past.

At present, the experience of Pakistan does suggest that, in other countries as well, the development of industrial entrepreneurs may depend largely on economic incentives which are determinable by government policy. In most underdeveloped countries industrialists may not be accorded the highest status—they were not in Pakistan—but the successful native entrepreneur will not be ostracised. Many countries have individuals in touch with the market and accustomed to respond to economic incentives, even at a moderate cost in social status: traditional traders, or money lenders, or growers of plantation crops. Most countries possess a civil service able to affect incentives by controlling foreign exchange and foreign competition and to provide reasonably satisfactory overhead facilities. At least a few countries should find high profits and high prices politically bearable so long as returns from industry are largely reinvested and contribute primarily to development, not conspicuous consumption. If economic incentives are sufficiently clear and strong, other factors can be less favorable than in Pakistan and some individuals or groups are still likely to respond to them.

In short, in Pakistan and probably elsewhere, social change in the past may have been adequate to create the necessary conditions for the emergence of industrial entrepreneurs. A substantial change in economic incentives and disincentives is then a sufficient condition to bring it about.

DISCUSSION

EVERETT E. HAGEN: Space forces me to be selective in my comments. I suspect that I was asked to be a discussant at this session because to the persons who arranged this program I am known to have been speculating concerning the noneconomic factors in economic growth to the analysis of which the Pakistan experience is relevant. Therefore, eliminating from my written comments certain oral ones concerning the other papers, I shall turn to Mr. Papanek's interesting discussion of the rapid emergence of industrial entrepreneurship in Pakistan.

By way of introduction to comments concerning his study, let me note two facts concerning the beginnings of economic growth. The first is that a low-income country cannot borrow methods from a developed country mechanically, as one person borrows another's suit of clothes or necktie. A high order of creativity is required to make Western methods or any new methods work well in a low-income traditional country. The second is that there are some psychological barriers in such societies to creativity in technology. The elite groups in a traditional society are not apt to use their energies creatively in improving methods of production for the reason that it is psychologically necessary for them to distinguish themselves from the simple folk by finding physical labor and attention to physical processes repugnant. This is an unconscious attitude; they are not aware of it. Moreover, both the elite and the simple folk are apt to have an unconscious image of the physical world as determining their lives rather than as being susceptible to change. This image bars them from being creative in technical work.

For brevity, these qualities of personality are the only noneconomic factors I shall refer to. Their existence is well established. Only their generality can be questioned, and the evidence of that too is rather persuasive. If these qualities characterize traditional societies, it is highly unlikely that economic growth will occur until some social process has resulted in change in these personality factors in some group or groups.

If so, such change must have occurred in Pakistan as in other countries where growth is occurring. While Mr. Papanek thinks it did not, in fact his study provides little evidence concerning the matter. First, it provides no evidence concerning personality. The unconscious motivations, values, and image of the world of the groups from which the Pakistan industrial innovators came may or may not be significantly different from those of other groups in Pakistan. Testing personality is a complex psychological task, which Mr. Papanek did not attempt.

Second, differences in personality, if they exist, are presumably due largely to differences in childhood environment, not merely in deliberate child-rearing practices. Observing the nature of childhood environment and its psychological impact is also a complex psychological task, which Mr. Papanek did not attempt.

Third, social background. The theory with which I am associated in the minds of some persons suggests that the innovational group is most likely to have been a social group of intermediate status in the past, as is true of Mr. Papanek's innovators. The theory does not suggest that an innovational group must be discriminated against at the time the innovation is taking place. Rather it refers to the situation at least a century or two earlier. It suggests that if a group that had a secure place in a traditional society comes to feel through some historical change that its values in life or its contribution to the society or both are no longer fully respected, the resulting anxiety affects the home environment and hence childhood environment and may set in motion a sequence of personality change from generation to generation, which over a period of say four to eight generations or more is apt to produce individuals who (1) are more creative than their predecessors and (2) no longer hold traditional values. Such groups are apt to seek new ways of reassuring themselves of their own worth and of gaining increased status in the society. In the modern world, the new ways are apt to include economic prowess and technological progress.

It is rather arbitrary to take some one historical event as marking the beginning of such a process of personality change, but if I were to do so, in the countries I have studied, I would take a religious decree of the 1650's in Russia, the beginning of the Tokugawa era in 1600 in Japan, regional relationships in Colombia that existed from the mid-sixteenth century, and so on.

The theory suggests that early innovating entrepreneurs will come predominantly, though not exclusively, from such groups. In Pakistan, the new entrepreneurs have come predominantly from a few very small social groups, and Mr. Papanek's account suggests historical pressures upon them. For legend has it, he states, "that all were converted from Hindu trading castes some centuries back." Hence I suggest that the few relevant facts we have concerning Pakistan are fully consistent with the importance of the noneconomic factors.

Mr. Papanek thinks the Pakistan experience inconsistent with the importance of such factors because industrial growth accelerated suddenly, whereas change in personality, as he rightly notes, is far more gradual. However, new personality may not cause a conspicuous change in behavior until it has burst through external barriers. Where institutional change suddenly eliminates former barriers and creates new economic opportunities, a slowly budding process may suddenly burst into bloom. This was true in Russia and also in Japan, where there is very strong evidence of basic personality change. I suggest that the opportunities which appeared in Pakistan may have been seized upon so rapidly precisely because history had created in a few social groups personalities highly conducive to seizing upon them.

Nevertheless, the Pakistan case seems unique in some respects, and Mr. Papanek must be credited with revealing this fact. The sudden industrial growth may have occurred on a smaller prior industrial base than in almost all other cases. Also, though traders, if they are indigenous rather than alien, often play an appreciable role in early industrial growth, they may have played a uniquely large role in Pakistan, for 45 per cent of Mr. Papanek's industrial entrepreneurs had themselves earlier been traders, and the fathers of 46 per cent of them had been traders, and these entrepreneurs now control 69 per cent of the capital. These are very much higher ratios than in England or Japan.

A comparative historical analysis might be extremely interesting. I hope that Mr. Papanek or some student of his may undertake it.

ANDREW M. KAMARCK: The paper of Boulding and Singh on "The Role of the Price Structure in Economic Development" presents a number of policy suggestions. Most of these, I believe, are worth considering by governments of developing countries. The general conclusion of the paper is that there is an optimum price structure for a stated goal of economic development but that "there is not the slightest reason . . . to suppose that the equilibrium price set, in the sense of classical or neoclassical equilibrium theory, is the price set which will go with the maximum rate of economic development." This thesis, in my view, is formally correct in the sense that to aid economic development one may have to interfere with what would otherwise be the price set (e.g., protect new industries, make special credit available to new entrepreneurs, make allowance for social costs, etc.) and not necessarily in the direction of the classical equilibrium price set. But the impact of the paper is fundamentally wrong in encouraging governments to discard the equilibrium price set as the point of reference for policy from which any departures have to be thoroughly justified. In a formal sense, the set of prices desirable for economic development would not be identical with the equilibrium market price set; mathematically, this may be a sufficient comment. But for economic policy, however, the equilibrium price set remains just as important as before. It provides a starting point from which analysis and policy making can start; it provides at least a partial answer to a comparison of the costs and benefits of any course of action.

One of the central problems in underdeveloped countries is to secure the most economic use of the scarce resources available; i.e., to allocate them as far as possible on the basis of minimizing costs and maximizing returns. For this, the equilibrium price set is the objective criterion from which policy must start. As long as it is accepted that prices that would be set in a market free of interferences or imperfections are a good objective and that any policy that differs from this (protection, aid to small entrepreneurs, etc.) must have adequate economic justification, it is possible to minimize waste and misallocation of resources from administrative and political interference.

The only help we are given to finding a substitute criterion by Boulding and Singh is that "there are no easy formulas for defining the optimum. . . ." Perhaps the closest approach they make to defining a new criterion is to say that "the object of price policy for developing society should be to some extent to anticipate the price structure of the developed society and to create it artificially in the hope that it will turn out to be self-justifying." I am afraid that this is not very helpful. Let us apply this policy to a situation that occurs frequently. Take, for example, a case where a new industry is beginning to grow up in a country: it usually starts by selling its products at a relatively quite high price, trying to cover its costs and earn profits to reinvest and grow. As time went on, its costs would decrease, its prices would be lowered in order to get a wider market or because competitors would come in, etc. Under the Boulding-Singh policy, the government would step in at the beginning to force the industry to sell its products at the ultimate lower price and, thus pretty effectively, frustrate all attempts at industrialization.

There are already enough difficulties in getting governments to pursue a rational economic policy, without attempting to provide a rationale as this paper does for the undermanned, overworked bureaucracies in the underdeveloped countries to try to dream up a new price structure from scratch. One of the commonest obstacles to development in the underdeveloped countries is the confident belief of many government officials that they know the "just" pattern on which economic development should proceed and that any growth that does not fit into their particular pattern of ethics should be stopped. There is some trace of this "papa knows best" in some of the comments made by Boulding-Singh. For example: ". . . certain traditional industries such as textiles, which contribute little to general development, may grow too fast. . . . Raising passenger fares and domestic electricity rates can prevent nonessential use of these services. . . . In some cases of artificial or superfluous wants, there is a need for enforcing penalty prices." It has been quite illuminating to me to watch how the Yugoslavs, who had a completely artificial price structure created to meet their policy ends, have learned through hard experience that one cannot have an efficient growth policy without guidance from the market.

Power's paper seems to me a real contribution to our understanding of the process of growth and of development. I am in particular impressed that he does not restrict himself to discussing a model but applies it. His analysis of the postwar rate of growth in Western Europe that "the very rapid increase in the capital stock in relation to labor supply that has occurred was made possible by a process of catching up to advanced technology and by a rising proportion of the labor force employed in the more capital-intensive sectors" is unquestionably right. His conclusion that this process cannot be repeated endlessly is also correct. I would feel, however, that there is still some scope for a continuation of a fairly high rate of growth, since there is still a relatively high proportion of peasants in the total labor force who could shift to more productive sectors, even in Germany, and there is still the possibility of drawing labor from southern Europe.

I thought it might be interesting to check the figures on his comment on the comparison on rates of growth between Germany and France. The following table presents a comparison of the increases in real gross domestic product, at factor prices, and the level of gross investment between Germany and France from 1952 to 1957.

The investment rates are the same and Germany came out far ahead on the total product. Even on a per capita basis, Germany still had a considerable

	Germany	France
Gross investment per cent of GNP	21	21
Per cent increase in GDP:		
Total	44	28
Per capita	36	23
Per member of labor force	28	28

lead. But if one compares performance per member of the labor force, it can be seen that France matched the German accomplishments. There was a large German importation of human capital in the form of a large inflow of skilled labor from East Germany. By receiving "ready-made workers," Germany was able to shift the age distribution of her population, with the labor force becoming a higher percentage of the total. In France, on the other hand, the number of Frenchmen in the labor force actually declined and the inflow of foreigners was largely comprised of unskilled Italians and Spaniards. An important factor in the growth of both the German and French economies was the shift of workers from the agricultural to the industrial sector. Power's conclusion does check out, therefore.

Power may also be underrating, although this may be included in his category of "laborsaving," the enormous scope there was in Western Europe for investment in plants as a result of the economic optimum becoming bigger due to the change from the prewar bilateral, fragmented markets to the larger Common Market. The expansion in the Common Market to include the EFTA countries and freer trade between the enlarged Common Market and the U.S. may provide a still further increase in laborsaving capabilities even without a change in existing technical knowledge.

Papanek's paper is a good example of the kind of clinical scientific work that is still badly needed in the field of economic development, and the findings he presents on how entrepreneurship has in fact developed in Pakistan are most valuable. I was particularly impressed by his comment: "What is . . . startling is the speed with which traders became industrial entrepreneurs and with which they became accustomed to this role." This is in direct contrast to the Boulding-Singh condemnation of the middle classes ("traders, shopkeepers, and others") as people who profit from economic growth and do not make "adequate sacrifice" and, consequently, should be penalized by higher prices for the goods and services they consume.

My final set of comments in this session is to call your attention to how difficult it is beginning to be to find something new to say on the theory of economic development. It is not impossible but it is beginning to be most difficult. I was impressed to find that the authors of the papers did find something that could provoke discussion, but it looks more and more to me that we are fast reaching the point where there will be little new that is useful to contribute to economic development theory.

In the field of economic growth, I believe, as Power's paper shows, it is still possible to make an appreciable contribution to techniques of analysis.

In economic development problems, however, there is probably still some improvement in techniques that might be made, for example, in the preparation of development plans. There is also needed a better awareness by the makers of models of the real problems faced by the makers of development plans. I was quite interested, for instance, to see two books that have come out in recent years. In one of these the author worked out rigorously a model of a two-commodity economy and how it would grow, and the other book gave advice, and good advice, on an economic development plan for Mauritius, a single-crop economy. Both books bore the name of J. E. Meade, but there was no indication that the second Meade profited in any way from the book written by the first Meade. In the main, it seems to me that in economic development problems, the task is largely becoming one of applying what we already know and learning to do so with good judgment and in full consciousness of the different institutional and cultural environments in which economic policy must operate in the different countries.

FREDERIC C. SHORTER: Mr. Papanek has undertaken two tasks. One is to explain a particular experience of economic change: the growth of manufacturing in Pakistan. The other is to test a number of general hypotheses concerning entrepreneurship. Since his data refer only to the single case of Pakistan, it would be claiming too much to regard the analysis as a very significant test of any broad behavioral hypothesis. Mr. Papanek recognizes this in his conclusion but thinks, nevertheless, that economic incentives can produce entrepreneurs in most countries without major psychological or other noneconomic changes. According to his analysis, this is what happened in Pakistan.

I agree that market incentives have been important, and the first part of these comments stresses just how important they were. I do not agree that we are, as economists, able to discard all noneconomic explanations of the Pakistan phenomenon, and this is explained in the second part.

To Mr. Papanek's economic explanation of the rapid growth of manufacturing in Pakistan, I would make one major addition. This is the important fact that the political partition of the Indo-Pakistan subcontinent in 1947 became, within a couple of years, a virtually complete economic partition as well. Import tariffs which formerly applied to third countries were applied on both sides of the new border. Pakistan also imposed export duties on raw jute, cotton, and other commodities going to India. There was a complete embargo on Indo-Pakistan trade, 1949-51, during an exchange rate controversy. And finally, both sides have imposed quantitative controls and administrative inconveniences. This ending of an economic union had powerful trade destruction and trade rectification effects, to use terms that describe the reverse of Viner's trade creation and trade diversion effects. Mr. Papanek mentions new opportunities for middlemen, but the consequences were far more pervasive. Certain types of commodity production formerly located in India were stimulated within Pakistan, e.g., jute baling and textiles, cotton textiles, cement, and paper, and the production of commodities whose Indian markets were cut off was depressed, e.g., raw jute and raw cotton. Cotton production rallied with the growth of internal demand within Pakistan, but raw jute production languished. The breakup of the economic union explains much of the difference between slow progress in agriculture and rapid growth in industry which has perplexed Pakistan. This change in market incentives began in 1948 and was in full effect by the end of 1949.

When Mr. Papanek points to the economic incentives for investment in manufacturing he only mentions import restrictions following the post-Korean slump. This dates the incentives from 1953. Manufacturing investment, on the other hand, was growing rapidly before that time, stimulated by the forces I have mentioned and facilitated by Korean boom earnings. Mr. Papanek's data on manufacturing assets probably lag behind decisions to invest by a year or more. His image of the entrepreneurial response, using 1953 as the start of market incentives, is of sensitive and immediate action. In order to explain pre-1953 investment, he characterizes that as "farsighted." My image is of a much slower response, which followed the change in demand with a substantial lag. Indeed, it was only in the agricultural sector that there was a rapid response. The correct decisions there were to switch production from export crops to foodgrains, which was a familiar process requiring little investment. In manufacturing, on the other hand, the response was much slower. I conclude that there were lags to be explained, and that we must ask whether a price was paid to overcome really serious limits on the supply of entrepreneurship. If my interpretation is correct, then Mr. Papanek's unabashed enthusiasm for import restriction as an instrument for promoting manufacturing growth and putting ownership in the hands of nationals rests on a weaker foundation than he has supposed.

When it comes to noneconomic and psychological changes that could have contributed to the increase of Muslim entrepreneurs, we are at a disadvantage as economists, because we lack hypotheses of our own and are skeptical of those which are advanced by unfamiliar disciplines. Nevertheless, we cannot discard all such possibilities without a serious search. I think of two worth investigation in the Pakistan case.

The first is the dramatic change in opportunities which Muslim businessmen experienced as a result of partition. Before 1947, they competed against other indigenous businessmen and foreign firms. In at least one important industry, jute textiles, a rigorous monopoly arrangement prevented entry, so that Muslims, who were latecomers, were unable to start more than one mill. After partition, the tables were turned and Muslims were favored in the new Pakistan. Individual Muslims were even singled out and persuaded by government officials to enter manufacturing in Pakistan. Non-Muslims were largely excluded by a variety of nonmarket restraints. The result has been a high proportion of Muslim industrialists, many of whom are new entrants to manufacturing, as Mr. Papanek has discovered. But is this not a result partly produced by noneconomic forces?

Another set of forces to examine is those of the Pakistan movement itself. I am impressed, as many before me have been, also, by the fact that this political movement persevered and succeeded in winning a separate country where Muslims expected to achieve their own kind of Islamic community. Their striving was religious, but it was also complex, channeling social, political, and economic fears and aspirations, too. Is it not possible that underneath it all there were fundamental changes going on, even among businessmen, which produced a greater willingness to take personal risks, more ability to survive in a government regulated business world, and more confidence in the ability to succeed? I do not arrive at these tentative suggestions by the same route as a psychologist. But it might increase our knowledge of the forces behind economic development in Pakistan if other disciplines were brought increasingly to bear on the problem. A further result, which Mr. Papanek should also welcome, would be to eliminate untenable psychological propositions as well.

THE LAGGING U.S. GROWTH RATE

HOW TO RAISE THE HIGH-EMPLOYMENT GROWTH RATE BY ONE PERCENTAGE POINT

By Edward F. Denison
Committee for Economic Development

My assignment is to devise a package of proposals that can raise the growth rate over the next twenty years by one percentage point. The package was put together for this session, but my estimate of the contribution each ingredient of the package would make to growth rests upon a study which is about to be published by the Committee for Economic Development.

I was asked to talk about ways of altering the growth of the economy's productive potential, when success in maintaining fairly full utilization of labor and other resources is assumed. We must also find ways to validate the high-employment assumption, but that is outside the present discussion.

Next, I shall be concerned with ways to raise the growth rate of real national income or product as defined and measured by the Department of Commerce. Certain characteristics of these output measures somewhat limit the ways available to raise their growth rate. They preclude raising the growth rate by shifting resources so as to produce things that are more urgently wanted; for example, by eliminating distortions in the pattern of output introduced by excise taxes, monopoly or farm programs. Again, the treatment of quality change in the price indexes bars raising the future high-employment growth rate of measured output by developing new or better final products more rapidly.

I omit from my discussion steps that would increase the satisfactions derived from output without changing its amount as measured. However, I shall not consider shifts of resources that would increase measured output while leaving unchanged or reducing a "truer" output measure. Real national income or product may be thought of as an index with certain biases that may be fairly uniform over time so long as steps are not taken deliberately to "rig" the index.

The specific series I shall use to measure economic growth is the index of real national income, which is the same thing as the index of real net national product except that components are weighted by factor cost rather than market price. It is *net* income or product, not

GNP, that economic policy properly seeks to maximize. Factor cost valuation is more appropriate and convenient than market price valuation for examination of changes in productivity or inputs. However, the conclusions I shall reach would be little changed if reference were to net or even gross national product.

Next, the assigned topic concerns means of changing the growth rate over a twenty-year period. This is a reasonable period to consider, but it should be understood that the length of the period greatly affects my results. Because most ways of changing output, and hence affecting the growth rate, are in the one-shot category, it is easier to raise the growth rate by a given amount for twenty years than for a hundred. Suppose, for example, some obstacle to efficient production costs us 1 per cent of the national income. If the obstacle were eliminated, which could be done only once, the level of national income thereafter would be 1 per cent higher than if the obstacle remained. The effect on the growth rate is approximately 1 per cent divided by the number of years over which the growth rate is computed. Thus elimination of the obstacle would raise the growth rate computed over a twenty-year period by one-twentieth of a percentage point, and the growth rate computed over a hundred-year period by one-hundredth of a percentage point. Some measures, on the other hand, would not have their maximum effect in a period as short as twenty years. Provision of additional education to the young and an increase in the saving rate are examples.

I shall use 1960 to 1980 as my twenty-year period, as if it were now 1960, because the calculations I draw on were based on those twenty years. But nothing would be changed materially by substituting 1961 to 1981, or 1962 to 1982.

Next, this paper is not directed to the question of how we can raise the growth rate from what it was in the past. The question posed for this session by Edward Mason is how the growth rate can be raised by one percentage point from "whatever the speaker thinks it will be" if unemployment is low, and in other respects we continue existing policies. I project a 1960-80 growth rate of 3⅓ per cent in potential national income, starting from a 1960 high-employment level. The amount by which this projected rate exceeds the actual rate in the past is not part of the one percentage point increment my prescription must provide. My task is to indicate how to raise the high-employment growth rate from 3⅓ per cent to 4⅓ per cent. Let me also stress that the topic is not whether 3⅓ per cent is a correct projection given existing policies, but how the rate can be raised one percentage point from whatever it would be if we do nothing special to affect it.

So much for ground rules. Now for some general observations. First, the difference between a 3⅓ per cent rate and a 4⅓ per cent rate is big. One implies an increase in per capita income from 1960 to 1980 of 33 per cent, the other of 61 per cent. Thus, a prescription to raise the growth rate of total income by one percentage point must be powerful enough to nearly double the anticipated increase in per capita real income. This conclusion must be modified insofar as the growth rate is to be stimulated by more immigration.

Second, I can hardly stress enough that, as I use the term, economic growth refers only to output. Quite aside from defects in measures of output, aggregate output is anything but a complete measure of economic welfare or economic progress, even less of total welfare or progress. To talk about changing even economic welfare, we would have also to consider, at the very least, real costs of production and the distribution of income and output.

In the present context this is no small caveat. It is the heart of the matter. The output we get, aside from involuntary underuse of resources, is determined by individual and collective decisions as to what is or is not worth doing.

I stress that to accelerate growth requires that someone act differently than he would otherwise, that this action usually means higher costs as well as higher output, and that more output is never the only effect of any action we might take. To decide whether steps to accelerate growth are sensible requires comparison of costs, the size of the effect on growth, and side effects.

This leads to the first of two conditions I deem essential for any program to stimulate growth a great deal beyond what it will be if we have no such objective. It is that the public be persuaded that acceleration of growth must be made an overriding national goal. Moreover, it must probably be persuaded of this for reasons other than the increase in individual welfare—probably reasons related to the external situation facing the country. This is necessary because there is a presumption that the more important steps required impose costs that exceed the income benefits and thus reduce welfare. Otherwise they presumably would be taken anyway. Even where the benefits may exceed the costs for the country as a whole, we are usually dealing with some deep-seated condition, often of long standing, that is likely to be changed only for some new and overpowering reason.

The presumption that the costs of a proposed change exceed the benefits may be refuted in specific instances. We need not suppose that we now act rationally on the basis of full information in reaching all of our individual and collective decisions, so we need not assume that every step that would increase growth would reduce individual welfare. In putting together my own package of proposals, I try to stress those where I think the possibility is greatest—I do not mean that it is necessarily great—that present practices derive from ignorance and would be changed by greater knowledge and understanding. This may imply a certain arrogance on my part, but without some such approach this paper could not be written.

The second condition necessary for any large effort to stimulate growth is full utilization of resources. It will hardly be possible to obtain support for a broad program to increase our productive potential unless we use rather fully the potential that we do have. Indeed, if unemployment is persistently high, we can look forward to actions that will reduce growth, including greater public and private restrictions on efficient production, and reduction of hours intended to spread employment rather than to increase leisure.

To add one percentage point to the growth rate I shall suggest a thirteen-part program that seems to me to combine feasibility, in the sense of avoiding things no one knows how to do, with minimization of sacrifice. The expected contribution from each proposal to the growth rate over twenty years will be stated in hundreths of a percentage point. Thus we need means of adding 100 hundreths of a percentage point to the growth rate.

Let me now indicate the general approach I use to assess the effect of each proposal on the growth rate. To raise the growth rate over twenty years by one hundredth of a percentage point requires some action not now in prospect that would make the 1980 national income .2 per cent, or nearly 2 billion dollars, larger than it would be in the absence of that action. The action must serve either to increase the quantity or quality of labor, land, or capital going into the productive system, or else to increase their productivity.

Because of the presence of economies of scale, an increment of slightly less than .2 per cent to total factor input in 1980 would probably suffice to raise the 1980 national income .2 per cent. I assume the addition to output would exceed that in total input by one-eleventh. Hence an increase in total input of slightly over .18 per cent would raise output by .2 per cent. This could, in principle, be accomplished by increasing all kinds of input by .18 per cent or only one kind of input by a larger percentage. From national income data I estimate that labor comprises 77 per cent of total input, capital 20 per cent, and land 3 per cent. Hence we could raise total input by slightly over .18 per cent in 1980 if we could raise labor input alone by .24 per cent over what it would otherwise be, or capital input alone by .93 per cent, or land input alone by 6.10 per cent. My proposals would not change the ratio of capital to labor input very much, so the problem of diminishing returns is not acute.

I shall first suggest some ways to increase inputs, indicating the contribution expected from each and sketching the basis of the estimate, and then turn to ways of raising productivity.

1. Yearly net immigration currently equals .2 per cent of our

population. As recently as 1911-15 it averaged .6 per cent. Immigration could be increased simply by changing the law. I assume the additional immigrants would make a per capita contribution of labor two-thirds as large, after adjustment for quality differences, as does the existing population. On this assumption, doubling the present immigration rate would raise labor input in 1980 by about 2½ per cent, enough to add .10 to the growth rate of national income. Extra immigration probably would not lower the per capita income of the existing population, but it would impose some other costs. It would also benefit our international relations. More immigration seems to me among the most sensible means of stimulating growth.

2. By working three hours a week, or about 8½ per cent, longer than we otherwise would in 1980, we could add .28 to the growth rate.

My projection of a 3⅓ per cent growth rate assumed that normal annual working hours will drop the equivalent of four hours a week from 1960 to 1980. This is about the rate at which they dropped during the fifties and much less than they dropped during the thirties and forties. Had I assumed a drop of only one hour instead of four, my projected growth rate would have been .28 higher. The calculation that we could add .28 to the growth rate by working three hours a week longer assumes that, in the range within which we will then be operating, more than three-fourths of the impact of shorter hours falls on output rather than being offset in labor efficiency. A decline of only one hour a week in twenty years would allow some leveling down where hours are especially long and some additional holidays, vacations, or coffee breaks, but no change in the standard forty-hour week.

Longer hours are in my list partly because it would be hard to obtain the desired total effect on the growth rate without them. But it is at least possible that we tend to arrive at a level of hours too short to maximize welfare. I say this partly because so little is known about the amount of income that actually is sacrificed for more leisure, and partly because hours have sometimes been shortened in order to spread employment.

Acceptance of this proposal requires employment opportunities so abundant that work spreading disappears as a reason for shortening standard hours, no reduction in legal standards for hours, and probably general acceptance by labor and employers of the need to maintain present hours. Since the AFL-CIO has already established the thirty-five hour week as an objective, this means a change in the present policy of labor.

3. I call upon additional education to raise the quality of labor enough to add .07 to the growth rate. I estimate that this requires addition of one year to the average amount of schooling that would otherwise be received by everyone leaving school between now and 1980. This estimate is derived from existing income differentials among

groups with different amounts of education, and the assumption that three-fifths of these differentials result from more education rather than reflect associated variables such as natural ability. It allows for the loss of work by those who will be in school in 1980 rather than working, on the assumption that if they were working their labor would be of half the average quality. Provision of the extra schooling would absorb .3 or .4 per cent of the national income.

My national income projection already assumes a considerable increase from the present age at which young people leave school. This trend can be confidently anticipated. To add still another year, without adversely affecting the quality of education, would place great strain on educational resources and require a major effort to secure teachers and facilities. Noneconomic benefits of extra schooling seem to me large, and this is another case where we might do more than we will be doing if the public had complete information on which to base decisions.

4. I estimate that we could add .03 to the twenty-year growth rate if we could cut in half structural unemployment and underemployment that results from long-term declines in labor requirements in individual areas and industries, including agriculture.

To contribute to growth in any real sense this must be done by speeding re-employment in expanding industries and areas, not by curtailing the displacement of workers that results from demand shifts or technological progress. If we have a bouyant economy in which unfilled jobs at least match the number unemployed, there ought to be ways to cut these types of structural unemployment in half. Swedish experience can be drawn upon in devising means.

5. I look to increased capital input for a contribution of .20 to the growth rate. This requires capital input in 1980 to be 19 per cent larger than it would be otherwise. Whereas my projection assumes a 64 per cent increase in capital input from 1960 to 1980, capital input must nearly double in the same period to provide this additional contribution to growth.

I look for this to be made possible by the other measures proposed to raise growth. I assume here that the crucial difficulty in accelerating growth by increasing the rate of capital formation concerns the possibility of providing attractive investment opportunities rather than of changing saving propensities. Hopefully, the other means of accelerating growth that I am suggesting would bring about the required broadening of investment opportunities. The capital-output ratio will be the same in 1980 if real national income increases 4⅓ per cent a year and capital input doubles or if national income increases 3⅓ per cent a year and capital input increases 64 per cent.

To raise capital formation this much requires a higher fraction of national income to be saved during the next twenty years, even though income would itself be larger with a higher growth rate. Hence it would require the sacrifice of consumption that could otherwise be made. If net private saving proves inadequate for so high a rate of net investment, as it may, additional saving could be provided by a surplus in the federal budget.

These five ways of increasing labor and capital input would provide 68 of the required 100 hundredths of a point in the growth rate. For the remaining 32 hundredths, I turn to ways of increasing output per unit of input.

6. From estimates by Gary S. Becker, it can be inferred that employment discrimination against Negroes, taking their qualifications as given, costs us .8 per cent of the national income. If discrimination could be abolished within twenty years by a concerted national effort, this would add .04 to the growth rate. To the extent that progress will be made anyway the economic costs of discrimination twenty years hence will be less than now, and the opportunity for further growth stimulation is overstated.

7. For nearly two centuries most economists have held that restrictions on international trade reduce output and living standards while most the public has believed the exact opposite to be true. The economists are right, but I am not sure how they can become more persuasive in the future than in the past. The cost to us of misallocation of resources resulting from barriers to international trade is not easy to estimate, but I have put it at about 1½ per cent of the national income. My projection assumes this percentage will not change. A serious program to stimulate growth would sweep away all barriers to imports and use our willingness to do so as leverage to get foreign nations to eliminate barriers to our exports. If we could eliminate all barriers far enough in advance of our twenty-year deadline to allow basic readjustments in production and trading patterns to be made throughout the world, this would add .07 to the growth rate.

8. Resale price maintenance laws result in the use of more resources in trade than are required to perform the function. Their cost is very hard to estimate, but I believe it to be large. If, as I have guessed, fair trade costs us 1 per cent of the national income, repeal of fair-trade laws could add .05 to the growth rate.

9. Formal obstacles imposed by labor unions in some industries against the most efficient use of resources costs us output, although again it is very difficult to say how much. My guess is that the cost here might also be 1 per cent of the national income. It seems to me possible that a determined program to adopt better ways of meeting

labor's needs might cut this cost in half. This would add .02 to the growth rate.

10. The effectiveness of labor incentives is important to productivity. Close correspondence between each employee's individual contribution to production and his individual reward, and employee awareness of the correspondence, are crucial. Shifts from time rates to piecework have sometimes been accompanied by large increases in productivity. Greater use of incentive pay systems where they are or can be made feasible is the obvious way to obtain substantial improvement. Better evaluation of individual performance for use in setting pay differentials among salaried employees and others paid by time, and in promotion, and more honest letters of recommendation, would be helpful. Certain changes in the tax laws might also help. It strikes me as possible that an intensive effort to improve incentives along these lines could contribute .05 to the growth rate. This could be done, for example, if the efficiency of one-tenth of the work force could be raised 11 per cent.

11. We could add to output by permitting consolidation in the regulated industries where this would mean greater efficiency. If claims that as many as 200,000 employees could be eliminated by railroad consolidation are correct and some minor economies are possible in other regulated industries, consolidation could add about .02 to the growth rate.

12. We could increase output by shortening the lag of average business practice behind the best known. My projection assumes that knowledge will be advancing fast enough to contribute .8 percentage points to the growth rate of real product, as measured, in the next twenty years. This exceeds my estimate of its rate of advance in the past. If we could shorten the lag of average practice behind the best known by nine months, which I consider a large reduction for the whole economy, output in 1980 would therefore be .6 per cent larger than otherwise and the twenty-year growth rate .03 higher. My projection of national product already assumes a reduction of nine months in the lag; thus I am calling for an additional nine-months reduction.

Sweeping away all barriers to international trade, aside from the benefits previously taken into account, would put pressure for modernization upon protected industries that are not now highly competitive, and some of the other steps I have suggested would be slightly helpful in this respect. For the rest, we should have to look to better means of disseminating information and alertness in adopting it. I may note in passing that there is nothing to be added on this account to the contribution of additional investment to growth that I have already computed.

13. For the final .04 required to reach my goal of a full point in the growth rate I look to the advance of knowledge itself. This requires that the state of knowledge in 1980 be where it would otherwise be in 1981. I would be uncomfortable in looking for a large contribution because we know too little about how to alter the rate at which knowledge relevant to production advances to feel sure we know how to get much more out of this source of growth. There is little evidence that the big postwar increase in research and development expenditures has had much effect on the rate of increase in measured productivity. Moreover, present prospects are that we shall absorb into research and development all the qualified personnel that will be available and be expanding these human resources as fast as is likely to be fruitful. But something can probably be done about the distribution of effort. There is extreme concentration of research expenditures in a few product lines and industries. In 1956, industries accounting for only 31 per cent of the national income made 96 per cent of research and development expenditures. Moreover, most of the effort, by far, is devoted to development of new and better products rather than cost reduction. It seems likely that greater dispersion of research effort might get us ahead faster, and it is to steps to bring this about that I would look for the additional contribution to growth.

I suspect there are important possibilities of raising productivity in research. But in the absence of agreement even on whether we should move toward more or less organization and planning of research, I cannot very well recommend what should be done that would not otherwise be done.

This completes my prescription for raising the growth rate by one percentage point. The contributions to be obtained from the individual elements obviously are crude estimates, but with any luck overestimates will be offset by underestimates and the package should achieve the assigned target.

Many alternative packages of proposals could be put together to arrive at the same effect on the growth rate. The study from which this list is drawn tries to provide a rather complete menu of the choices available to stimulate growth. From that list anyone can make his own combination. This particular package is fairly concrete and practical in the sense that the principal steps required do not exceed our knowledge. I have tried to put together as attractive a package as I could. In my view it would not impose intolerable burdens. But this does not mean I am advocating it or think the country would necessarily be better off for adopting it. This depends mainly on a judgment as to how important it is to raise the rate at which output grows, and why.

TECHNICAL PROGRESS, CAPITAL FORMATION, AND ECONOMIC GROWTH*

By Robert M. Solow
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Introduction

The goal of this paper is an answer to the question: How much fixed investment is necessary to support alternative rates of growth of potential output in the United States in the near future? Notice that I said "necessary to support" and not "sufficient to generate." I believe that a high rate of capital formation is required if the growth of aggregate productivity and output is to accelerate, but I do not believe that it is all that is required. Notice also that I said "potential output" and not "realized output." The relation between investment and output is two sided, as I think I once heard my friend Evsey Domar say, and I am concerned here with the supply side only. Whether any particular required rate of investment will be accompanied by a high enough level of final demand to use the resulting capacity is another question. And how a particular required rate of investment can in fact be induced is yet another. Neither will be answered in this paper.

I shall try to deduce an answer to my question by estimating an aggregate production function, because I do not know any other way to go about it. One aggregate production function is pretty much like another, I admit, and this one has only a few distinctive markings. They are: (1) the data differ a little from those normally used in this kind of enterprise; (2) it is assumed that *all* technological progress needs to be "embodied" in newly produced capital goods before there can be any effect on output; (3) a sharp distinction is drawn between actual output and potential output, and the method includes a built-in estimate of the gap between them.

The next section of the paper sets out the assumptions of this approach. Then I shall briefly describe the data, present some alternative estimates of the production function, and draw the implications for capital requirements.

Assumptions and Theory

I assume that new technology can be introduced into the production process *only* through gross investment in new plant and equipment.

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* All the work in this paper was done by Thomas Rothenberg and Richard Attiyeh of M.I.T., Yale, and the staff of the Council of Economic Advisers.

This is certainly not literally true. No one knows whether it is more or less true than the exactly opposite assumption that technical progress makes new and old capital goods more productive in the same way and in the same proportion. I have worked both sides of the street in different papers, and I will produce estimates on both assumptions in this paper. That seems to me to be the moral equivalent of Edward Denison's suspiciously round assumption that half of new technology is the "embodied" kind and half the "disembodied" kind. The most casual kind of reflection suggests to me that embodied technological progress is by a substantial margin the more important kind.

Suppose that capital goods produced in any year are 100λ per cent more productive than those produced the year before. Suppose also that if a gross investment of $I(v)$ is made in year v, the amount surviving in a later year t will be $B(t - v)$. Under the further assumption that labor and machines of various vintages are arranged in such a way as to yield maximum output (or equivalently that all workers receive the same wage regardless of the age of their equipment) it can be shown that the stock of surviving capital goods of different vintage and productivity can be summarized for production-function purposes in an "equivalent stock of capital." The equivalent stock of capital adds up the survivors of each vintage after weighting them by the appropriate productivity improvement factor. To be precise, the equivalent stock of capital in year t is

$$J(t) = \sum_{v=-\infty}^{t} (1 + \lambda)^v B(t - v) I(v) \tag{1}$$

Potential output is a function of the available equivalent stock of capital and the available input of labor $N(t)$, say

$$P(t) = F(J(t), N(t)) \tag{2}$$

No explicit mention of technical progress is needed; it is already wrapped up in J. What we observe, however, is not $P(t)$ but actual output $A(t)$. It is tempting to try to make some estimate of potential output and then to use it in estimating the production function. But since what one expects from the production function is a statement about potential output, it seems a little circular to impose an independently calculated measure of potential output to begin with. I have tried to get around this difficulty by a device which owes a lot to some of Arthur Okun's ideas.

Actual output falls below potential output because employment is less than the available supply of labor and because some capital stands idle. There is a logical pitfall here. If it is assumed—as I have tacitly done in (2)—that labor and already existing capital are substitutable for each other, then in principle capital should never be idle unless its marginal value product has fallen to zero (if depreciation occurs with use rather than with time, I should say marginal net product). Otherwise it would pay to use more capital with the current input of labor; the extra product would provide at least some quasi-rent. Yet we believe there to be such a thing as idle capacity in periods of economic slack. The paradox is easily resolved in a model which permits virtual substitution of labor and capital *before* capital goods take concrete form, but not after. I have analyzed such a model [3] but I do not at the moment see any direct way of using it in empirical work. So I shall simply assume, as an approximation, that the ratio of actual to potential output is a function of the unemployment rate. (The unemployment rate I shall be using is the difference between the "full employment" supply of man-hours and the number of man-hours actually worked, expressed as a ratio of the full employment supply. It differs from the ordinary labor-force concept in a number of ways—for example it can become negative, and did so in 1942-44, because the number of man-hours worked exceeded the normal supply.) If I let $u(t)$ stand for the unemployment rate:

$$A(t) = f(u(t))P(t) = f(u)F(J, N) \tag{3}$$

With a convenient choice of functional forms for $f(u)$ and $F(J, N)$, I can hope simultaneously to estimate the production function for potential output, and the curve which relates the degree of slack to the unemployment rate. The raw materials are time series of actual output, the full employment supply of labor, and the equivalent stock of capital, to be described in a moment.

To simplify computations, I have used the Cobb-Douglas function with constant returns to scale for $F(J, N)$. For $f(u)$ I have used what amounts to the half of a normal curve lying to the right of the peak. This choice has the double advantage of being workable and of having the right general shape. One would want, I think, to have a kind of diminishing returns to the reduction of unemployment after a point, and this occurs as the normal curve flattens out near its peak. Also, any linear approximation near usual unemployment levels tends to show actual output dropping to zero when the unemployment rate reaches 30 per cent or so, and the normal curve avoids this.

With those specializations, my production function now reads:

$$A = a10^{b+cu+du^2}J^{\alpha}N^{1-\alpha} \tag{4}$$

though I shall fit it in the form:

$$A/N = a10^{b+cu+du^2}(J/N)^{\alpha}. \tag{4'}$$

or

$$\log (A/N) = \log a + b + cu + du^2 + \alpha \log (J/N). \tag{4''}$$

In (4″) there are two constant terms, one belonging to F and one to f. They can be separated as soon as I make a statistical definition of "full employment." It happens that the measure of unemployment used in this paper coincides numerically with the usual labor force measure when they are both equal to about 4 per cent. That figure has become, at least temporarily, the conventional description of full employment, and I adopt it here. Now I must have actual output equal to potential output at full employment. This implies

$$f(.04) = 1 \quad \text{or} \quad b + .04c + (.04)^2 d = 0$$

From estimates of c and d I can calculate b, and then from (4″) I can find a.

With all constants estimated it is possible to ask and answer such questions as: given the expected increase in the supply of man-hours, and given the already determinate mortality of existing capital, how much gross investment is necessary to increase *potential* output by 3 or 4 or 5 per cent in the next year?

Data

Several time series measuring the "equivalent stock of capital" were constructed along the lines of equation (1), with alternative trial values of λ. The case $\lambda = 0$ is, of course, the plain stock of capital. All are expressed in 1954 prices. Stock and equivalent stock figures were computed separately for plant and equipment—sometimes using different values of λ for each component, on the chance that equipment improves in productivity more rapidly than plant—with mortality calculated according to the schedules devised by George Terborgh. Because the plant and equipment series are quite highly correlated, I did not try to use them as separate inputs in the production function. Instead, every stock of capital or equivalent stock of capital figure in my regressions is actually the sum of a stock of plant and a stock of equipment, each generated from gross investment data with its own mortality curve and its own value of λ. The investment series used is consistent with "producers' durable goods" plus "other construction" in the national accounts, with the exception that religious, educational, hospital and institutional construction are excluded. (Dwellings are excluded from the stock of capital, which is intended to be a measure of privately-owned business plant and equipment.)

The output concept comparable to this measure of capital stock is gross national product minus the product originating in general government, government enterprises, households and institutions, rest of the world, and services of houses: This defines a reasonably close approximation to the output produced by the privately-owned stock of plant and equipment. It is expressed in 1954 prices.

The series for "full employment man-hours" is essentially due to Knowles [2]. This is based on the age and sex distribution of the population together with smoothed trends in participation rates and annual hours worked. Some minor adjustments were made, particularly to eliminate government employees since the output and capital series are restricted to the private business economy. Analogous adjustments were made to the BLS series on man-hours worked in the private economy, to restrict the coverage approximately to that involved in the other data used in the analysis.

Estimated Production Functions

Equation (1) defines the equivalent stock of capital for any constant rate of increase in the productivity of capital goods. As noted earlier, I have experimented with different improvement factors for plant and equipment separately and then added the two series. The regression results I shall report here use the following six combinations:

	J_0	J_1	J_2	J_3	J_4	J_5
λ plant	0	.02	.02	.02	.03	.03
λ equipment	0	.02	.03	.04	.03	.04

The multiple regressions themselves are given in the following table: The parameters are designated as in (4), with standard errors following in parentheses, except that $f(u)$ was actually estimated as $10^{b+cu+d(u+.180)^2}$.

Inspection of Table 1 yields some obvious generalizations.

(*a*) From the similarity of the estimated values of α for the equations with J_2 and J_4 and for those with J_3 and J_5, it seems clear that more depends on the improvement factor for equipment than on that for plant. This is associated with the fact that between 1929 and 1961 the ordinary stock of plant increased by about 50 per cent while the stock of equipment grew by almost 170 per cent.

(*b*) The estimated elasticity of output with respect to the equivalent stock of capital declines as the improvement factor (particularly that for equipment) increases, for obvious reasons.

(*c*) Very low values for the improvement factor lead to implausible values for α. One gets nonsense results unless considerable weight is given to technological progress.

(*d*) The estimated curve relating realized to potential output is not very sensitive to alternative assumptions about the improvement factor.

TABLE 1

	log a	b	c	d	α	R^2	Standard Error of Estimate
J_0	−.4179	.0460	−.1244 (.2016)	−1.344 (.413)	1.2377 (.0993)	.9622	.0322
J_1	−.3934	.0395	−.2814 (.1524)	− .979 (.315)	.6323 (.0364)	.9789	.0241
J_2	−.3328	.0382	−.3187 (.1465)	− .879 (.304)	.4990 (.0274)	.9806	.0230
J_3	−.2956	.0370	−.3386 (.1398)	− .813 (.291)	.4026 (.0221)	.9825	.0220
J_4	−.3888	.0387	−.3097 (.1427)	− .909 (.295)	.5054 (.0270)	.9816	.0225
J_5	−.0375	.0375	−.3319 (.1381)	− .838 (.287)	.4160 (.0214)	.9828	.0217

(*e*) The multiple correlation is a little higher and the standard error of estimate a little smaller for the larger values of λ. But because the estimates of α change in an offsetting way, goodness of fit is a poor way of distinguishing among neighboring values of λ.

It will be interesting to compare the conclusions flowing from estimates of (4) with those derived on the assumption that all technological progress is "disembodied," falling alike on new and old capital goods and therefore not requiring investment to generate an increase in productivity. For this purpose I have also estimated the production functions

$$A = a(1 + \mu)^t J_0^{\alpha} N^{1-\alpha} 10^{b+cu+d(u+.180)^2} \tag{5}$$

with the result

$$A = 1.10(1.025)^t J_0^{.11} N^{.89} 10^{.0365-.251u-.888(u+.180)^2}. \tag{5'}$$

The squared correlation is .9945. The elasticity of output with respect to J_0 is about equal to its standard error. Essentially, output per man-hour just rises at 2½ per cent a year.

Actual and Potential Output

A useful by-product of this procedure is a built-in estimate of the ratio of actual to potential output as a function of the unemployment rate. It must be remembered that the measure of unemployment I am using is not the conventional one. I define the unemployment rate in any year as the difference between the estimated full employment supply of man-hours and the number of man-hours actually worked, expressed as a fraction of the full employment supply of man-hours. This should be in principle a better measure of the excess supply of labor, for two reasons. In the first place, when the demand for labor is slack some people leave the measured labor force although they would willingly take work if they thought work were available. This kind of "unemployment" represents excess capacity. Second, involuntary part-time work, though it does not show up as unemployment in the official statistics, does affect the alternative concept. On the other hand, the usual labor force statistics undoubtedly contain less error than the ones used here.

A plot of the two measures of the unemployment rate against each other shows that most points fall along a smooth nonlinear curve. It happens by chance that the two measures coincide approximately at an unemployment rate of 4 per cent, which is the conventional definition of "full employment" I am using. Columns 1 and 2 of Table 2 give a few selected corresponding values of u (the unemployment rate used in this paper) and u^* (the usual labor force unemployment rate).

It is also the case, mentioned earlier, that the regression equations using different equivalent stocks give very similar curves relating the ratio of actual to potential output to the unemployment rate. The ratios corresponding to J_4 and J_6, and those corresponding to equation (5) are given in columns 3, 4, and 5 of Table 2.

TABLE 2

u	u^*	A/P J_4	A/P J_6	A/P (5)	A/P Okun's Law
−.13	.01	1.200	1.203	1.172	1.096
−.03	.02	1.094	1.094	1.084	1.064
.00	.03	1.054	1.054	1.051	1.032
.02	.035	1.028	1.025	1.027	1.016
.04	.04	1.000	1.000	1.000	1.000
.06	.05	.971	.971	.976	.968
.08	.06	.941	.942	.949	.936
.10	.07	.911	.912	.921	.904
.27	.21	.645	.652	.671	.456

The only other systematic attempt to relate the gap between actual and potential output to the unemployment rate is Okun's Law [1] which states that the percentage excess of potential over actual output is 3.2 times the excess of the (conventional) unemployment rate over 4 per cent. In my notation, Okun's Law states that

$$\frac{P-A}{P} = 3.2\,(u^* - .04).$$

Okun himself, it should be noted, has used this relation only for the period since 1955. The ratio of actual to potential output read from this equation is shown in the last column of Table 2.

It is altogether remarkable that Okun's Law and the approach used in this paper give very similar results for conventional unemployment rates between 3 and 7 per cent, despite the fact that they are based on entirely different data (and the fact that u relates to private employment and u^* to total). It is only natural that they should differ for extremely high unemployment rates and extremely low ones. I introduced the possibility of considerable curvature into this approach because I wanted to allow for diminishing returns as the unemployment rate becomes very low. But as Table 2 shows, at very low levels of unemployment, the approach in this paper indicates a greater excess of actual over normal full employment potential than does Okun's Law. The required curvature is actually in the equations; the apparent paradox arises because the man-hours figures allow for the supernormal increase in labor force and hours worked during the war years of very low unemployment.

Investment Requirements for Economic Growth

With the unemployment rate fixed at $u = .04$, any one of the estimated production functions states that potential output is constrained by the currently available input of labor and by the whole history of capital formation. If the American economy can and must move along such a function in the next few years, the growth of productive potential is tied in a specific way to the growth of the labor supply and the rate of investment. Movements in the supply of hours of work are usually taken as given. That leaves the volume of investment as the most important determinant of growth which is actually open to influence by policy. (There is also the equally important possibility of influencing the rate of technological progress, λ; but that leads to an entirely different set of questions.)

The movement of full employment man-hours for the entire economy in the next few years can be estimated with reasonable accuracy from demographic trends. It is less easy to estimate the supply of man-hours to the private economy, because that is less purely a matter of demography. Public employment has been gaining relative to private employment in recent years, and since there is no reason to expect a reversal of this trend, it is safe to conclude that the supply of labor to the private economy will rise more slowly than the total. With the labor force expected to grow at about 1.7 per cent per year and average annual hours worked declining at an annual rate of some 0.3-0.4 per cent, the supply of potential man-hours is likely to increase at about 1.3-1.4 per cent a year in the near future. This is a more rapid rate of increase than in the decade just past. But the supply of labor to the private economy will rise more slowly than that. Between 1950 and 1960, our series for the supply of potential man-hours to the private economy rose at an average annual rate between 0.4 and 0.5 per cent. For looking ahead, I have made alternative calculations with an annual increase in labor supply of 0.65 per cent and 1.0 per cent.

With this growth in labor input, a substantial amount of investment is needed just to keep capital per man-hour constant. Suppose that some 2½ per cent of the capital stock is retired each year. (I am speaking now of the ordinary capital stock, with $\lambda = 0$.) Then with a capital-output ratio of about 1¾, 4½ per cent of private GNP must be invested just to replace worn-out capital, and between 5½ and 6 per cent of GNP must be invested (depending on the assumed rate of growth of the labor force) to keep capital per man-hour constant. A slightly higher rate of investment would be needed to keep capital per worker from falling.

When we deal with an equivalent stock of capital the calculations are a little more complicated but the results not very different. The annual mortality of "equivalent capital" can be calculated. For J_3 and J_5 it runs just over 3 per cent of the equivalent stock; for J_4 it is about 2½ per cent. The capital-output ratio is much higher because the improvement factor makes the equivalent stock considerably higher than the capital stock itself. Working against this is the fact that a dollar's worth of investment is more potent, creating more than "a dollar's worth" of equivalent capital.

Generally speaking, the result is that the maintenance of capital intensity—and the accompanying achievement of low rates of growth of output—can be obtained with a somewhat slighter investment burden than consideration of the ordinary stock of capital would suggest.

To attain a high rate of growth of output, the equivalent stock of capital must grow faster than the input of labor. Additional investment now performs a function beyond the widening process as the labor force increases and the conventional deepening process as the capital-intensity of production increases. The third function is, of course, what one might call quickening: the carrying into production of new technology as represented by the improvement factor. Table 3 shows—for 1960-61 values of the variables—the percentage of business GNP which must be invested gross to permit different rates of growth of output. The calculations are shown for J_3, J_4, and J_5 with the two alternative rates of growth of the labor force mentioned earlier.

In interpreting these figures it should be remembered that the output concept used here covers about 80 per cent of the total gross national product. Also the omission of various kinds of institutional construction reduces the gross investment total to about 93 per cent of "producers' durable equipment" plus "other construction" in the national accounts. Thus an investment quota corresponding to the ratio of business fixed investment to GNP would be about 86 per cent of the number given in Table 3. With this adjustment, the estimates in the table seem to be of the right order of magnitude. They suggest that a necessary condition for increasing the rate of growth of output from

TABLE 3

INVESTMENT QUOTAS FOR ALTERNATIVE GROWTH RATES

Growth Rate	3%	3½%	4%	4½%	5%
J_3					
Slow growth in man-hours	9.9	11.2	12.4	13.8	15.0
Fast growth in man-hours	9.2	10.4	11.7	13.1	14.3
J_4					
Slow growth in man-hours	9.0	10.2	11.4	12.5	13.7
Fast growth in man-hours	8.5	9.8	10.9	12.0	13.2
J_6					
Slow growth in man-hours	10.1	11.3	12.6	13.9	15.3
Fast growth in man-hours	9.4	10.8	12.0	13.3	14.7

about 3½ per cent annually to 4½ per cent annually may be a 20-25 per cent increase in the investment quota from the range 10-11 per cent of business GNP to the range 12-14 per cent of business GNP. J_4 gives both a lower required investment quota and a smaller relative increase to get from 3½ to 4½ per cent growth than do J_3 and J_6. Alternative improvement factors have only a minor effect on the implied investment requirements because the estimated elasticity changes to make a partial compensation.

Rough calculations show that to maintain an accelerated rate of growth throughout a decade requires a slowly rising savings-investment quota. But the rise is slow and the average investment quota only slightly above the initial figure shown in Table 3.

By comparison, the production function (5), which makes technological change a pure "residual," gives altogether different results. The high time trend—a residual increase in output of 2½ per cent annually with labor and capital constant—and the low elasticity of output with respect to capital imply that a fairly rapid rate of growth of output per man-hour is achievable with very little investment but that a visibly higher rate of growth can be supported only by an unrealistically high investment rate. For example, with the slower rate of growth of the labor force, (5) says that a 3 per cent increase in potential output is achievable with a slight decrease in the capital stock. The gross investment implied is about 3½ per cent of potential output; the net investment is actually negative. But to lift the rate of growth to 4 per cent a year would require an investment quota of almost 20 per cent of potential output. These implications seem wholly unrealistic to me, and they suggest that the "embodied" model is a better one. But I must admit that there is nothing in the analysis I have given which "proves" that (4) is a better model of production than (5).

Entirely apart from all statistical difficulties, one must admit the possibility that our economy is not free to move back and forth along a production function like (4) or even (5). An attempt to accelerate movement out along the function may have the effect of shifting the function itself. For one thing, a sharply higher rate of investment may bring about premature scrapping of old equipment. Second, there may be limits even in a mature economy to the speed with which the system can adjust to large inflows of new capital. Third, a change in the investment quota is itself a change in the composition of output; changes in the composition of output may also have the effect of shifting the function bodily, though it would be difficult to make an a priori judgment about the nature of the shift. This reflection suggests the wisdom of trying to make such analyses of the productivity of investment sector by sector. This would place a greater strain on the availability of data, but might in compensation yield important conclusions about the best sectoral composition of investment.

Conclusion

Capital formation is not the only source of growth in productivity. Investment is at best a necessary condition for growth, surely not a sufficient condition. Recent study has indicated the importance of such activities as research, education, and public health. But while economists are now convinced of the significance of these factors in the process of economic growth, we are still a long way from having any quantitative estimate of the pay-off to society of resources devoted to research, education, and improvements in allocative efficiency. Since such estimates must form the foundation for a national allocation of resources in the interests of economic growth, their provision by hook or by crook presents a research problem of great theoretical and practical interest. The object of this paper is to make a start in that job for the much easier and prosaic case of tangible capital formation.

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DISCUSSION

Gerhard Colm: Edward Denison has presented an imaginative, well-reasoned, and statistically well-supported paper. What criticism I have is primarily related to the way the question has been posed for his answer.

The question was: What changes in policies and attitudes are needed to increase the rate of growth by 1 per cent per annum over what it otherwise would be over a twenty-year period, assuming success in maintaining a reasonably full utilization of labor and other resources?

Denison has tackled the question in more specific terms by stating his opinion that without any change in policies, except those needed to maintain fairly full employment, the rate of growth would be 3⅓ per cent per year. The 1 per cent increase would give us 4⅓ per cent, which happens to be close to the rate which has been suggested as a desirable and feasible goal for the American economy. Denison's computations are therefore not merely an academic exercise in applied growth theory but they are actually used in evaluating the feasibility of that objective and considering policies needed to achieve the objective. Denison himself believes that such an increase in the rate of growth could be achieved if the nation considers that it is an important objective. Others in the audience may be skeptical about the feasibility of the objective when they hear that, e.g., "sweeping away all barriers of import" is one of the thirteen policies needed to achieve the increase in the rate of growth.

I do not think that such drastic measures will be needed to achieve a rate of growth of 4⅓ per cent. Denison, in accord with the question he has been asked to answer, has assumed and not analyzed the effects of continuing full employment on all other factors determining the rate of growth. The expectation of business and labor that markets and employment opportunities will expand in accord with potentialities should have a significant effect on the pace of technological adaptations. Failure in that respect explains, I believe, in large part the low rate of growth in the recent past. Considering the unused technological possibilities, a continuing and adequate expansion in markets should have an even greater effect on the rate of growth in the future. Denison has made an arithmetic allowance for the effect of starting from a below full employment level. This effect is obviously small spread over a twenty-year period. Some of the changes which Denison believes require far-reaching policy measures would, I believe, result from continuing a full employment expansion in aggregate demand.

Perhaps Denison and those who have formulated the question for this session would say that we had many discussions about anticyclical fiscal and monetary policies and that therefore it is desirable that a session should focus exclusively on the supply side of economic growth. Such separation of the issues will, in my opinion, lead to erroneous conclusions, because changes in demand developments may have a significant effect on the supply factors. I admit that I do not know a satisfactory method of measuring the effect of continuing high employment on business and labor attitudes. That these effects are significant can hardly be denied. I believe that reasonable allowance for these effects based on estimates is better than neglecting them in projecting future growth rates.

If my conviction is right that the rate of growth with full employment policies but no other changes is higher than Denison's 3⅓ per cent—perhaps closer to 4 per cent—then less sweeping policies are needed to achieve a 4⅓ or 4½ per cent rate of growth.

This leads me to a second criticism of the manner in which the question for this session is posed. Asking what policy changes are needed to increase the rate of growth by 1 per cent over what it otherwise would be implies that it is immaterial whether one adds 1 to 3 per cent or 4 per cent or 5 per cent. While I think that not all of Denison's thirteen policies are needed to raise the rate of growth from, say, 3 to 4 per cent, I would largely agree with his list if an increase of 1 per cent over and above a 4 per cent rate were discussed, assuming that full employment policies alone would give us a 4 per cent rate of increase. I think Denison has given us a good list of policies even though every economist according to his own predilections might use a somewhat different mixture. I would add policies in support of health to such a list and would give research and the quicker application of advanced technology a greater weight than Denison did.

On the question as to the increase in capital input needed, I notice that Denison estimates that an increase of 2.5 per cent per year (64 per cent increase in twenty years) and 3.5 per cent per year (doubling in twenty years) is associated with the growth rates of 3⅓ and 4⅓ per cent, respectively. Denison's package implies, nevertheless, some increase in the rate of saving and some sacrifice of consumption compared with what it otherwise would be. He considers a surplus in the federal budget as one possible way for providing additional saving. The National Planning Association's estimates (prepared by Sid Sonenblum and associates) assume that the long-term trend towards decline in the capital-output ratio (measured by the value of gross stock in plant and equipment per dollar of private GNP in 1960 prices) will be resumed. The increase in the efficiency of capital in the NPA estimates is associated with a substantial reduction in the average age of plants and equipment. In spite of an assumed quickening rate of replacement, the increase in efficiency of capital would make it possible to achieve a 4 to 4½ per cent rate of growth with only a modest increase in the ratio of business investment to GNP. This would imply only a small increase in the needed rate of saving.

Even if the future increase in the efficiency of capital should be somewhat less than that suggested by long-term trends and by the technological and managerial advances which are in the making, I still would not believe that scarcity of saving would be a serious bottleneck of an increased rate of economic growth.

Advances in the application of new techniques generate, to some extent, the means to finance the added capital expansion by increased depreciation and obsolescence allowances and larger profits. Whether, in addition, measures will be needed to induce saving of individuals, e.g., by a change in taxation, I feel unable to predict. I have serious doubts that increases in taxation above expenditures of the government would, under conditions of the American scene, be an effective means for providing an increase in saving if it should be needed. If measures favoring a shift from consumption to saving are taken prematurely, they may have the effect of curtailing aggregate demand without raising investments. A reform in personal taxation is desirable for other reasons, but I am not persuaded that such a reform is indicated at the present time for the purpose of increasing the rate of saving and thereby of promoting investment and economic growth. But I admit that I have not yet had a chance to examine Simon Kuznets' recent study which is reported to have reached a different conclusion.

Besides policies in support of adequate demand and in support of technological advances, every effort should be made to remove the obstacles to economic growth by measures which are included in Denison's list, such as reduction in structural unemployment, liberalization of trade, removal of restrictive business and labor practices, and so on. In summary, I do believe that without drastic changes in institutions and attitudes the long-term rate of growth could be lifted from the 2½ per cent of recent years to 4½ per cent, at least for the next decade.

JOHN CORNWALL: Solow's new function is a welcome addition to the literature on growth. Those of us who have worked with the type of function where productivity is "disembodied" have been disturbed by some of the implications. As Solow points out, when productivity is "disembodied" little in the way of capital formation is needed in order to grow at comparatively modest rates of growth. However, a more ambitious growth rate soon demands an impossibly high ratio of investment to GNP because of the high rate of capital formation needed. And these ambitious growth rates are not at all high but of the order of magnitude of 4 or 5 per cent.

But with his new function, when productivity increases are embodied in the investment process, it becomes possible to step up the targeted growth rate to 5 per cent without intolerable cuts in consumption and government spending. In general, it can be said that when productivity is treated as a residual, the capital requirements are very small for relatively low targeted rates of growth of output. But when this growth rate is stepped up, the required rate of growth of capital increases very rapidly. On the other hand, if productivity is embodied in the investment process, the required capital formation will be higher at the same relatively low targeted rate of growth of output. But as this growth rate is stepped up, the required rate of growth of capital does not increase nearly as rapidly. Furthermore, the capital requirements will be the same at comparatively low targeted rates of growth of output.

However, I think there is a defect in this new approach if you push it too far. It has to do with the long-run implications of the new function in a full employment model. I am not thinking here of a neoclassical model where flexible prices ensure full employment, but a more Keynesian one of imperfections and inflexibilities. That is, you include Solow's new function in a system of difference equations that has on the demand side some sort of capital stock adjustment mechanism. Then, if the government sets as its target full employment of all resources (so that output is given by the production function when all labor and capital are employed), in the long run the rate of growth of per capita income will be zero. Let me show how this works.

With the new production function $Y_t = J_t^{\alpha} N_t^{1-\alpha}$, where Y is output, J the equivalent stock of capital, and N the full employment supply of labor, the rate of growth of output (r_y) depends on the rate of growth of capital (r_j) and the rate of growth of the labor force (r_n); i.e., $r_y = \alpha r_j + (1 - \alpha) r_n$. On the demand side assume an investment equation of the following sort: $I_t = b(1 - \lambda) Y_{t-1} - cJ_{t-1}$, where λ is a tax parameter. Dividing both sides by J_{t-1} gives: $r_j = b(1 - \lambda) Y_{t-1}/J_{t-1} - c$. Thus, the rate of growth of capital, and therefore the rate of growth of output, depend on the capital-output ratio (assuming the rate of growth of the labor force to be exogenous). A little thought will show that this sort of system will eventually move to an equilibrium capital-output ratio where the rate of growth of capital and output are equal. And if $r_y = \alpha r_j + (1 - \alpha) r_n = r_j$, then $r_y = r_n$.[1] I find it hard to believe that if you always have full employment, per capita income will sooner or later be constant. In effect, what is needed is a production function that allows productivity to be partly "embodied" and partly "disembodied."

I do not think it is any accident that Denison's method of increasing the full employment growth rate involves a whole set of policies. Denison's implicit production function implies that for every increase of 1 per cent in the targeted growth rate above the 3⅓ per cent level, the rate of growth of capital must be increased by 5 per cent. These are rather drastic requirements, and it is no wonder that only 20 per cent of the job is to be handled by additional capital formation.

Had Denison allowed for some of the productivity increase to be introduced through the investment process, he would have found it much easier to give more weight to increased capital formation in his program. As it is, he must rely on immigration and a slowing down in the rate of decline in the work week to do 40 per cent of the job. Since it is hard to argue that either one of these two policies will increase individual welfare, one becomes rather pessimistic about the possibility of further increasing welfare by means of a higher growth rate.

However, the pessimism is unwarranted, as Solow has pointed out, at least as far as supply problems are concerned. This leads to my concluding remarks. The authors of both papers in this session were instructed to assume that aggregate demand would be sufficient to absorb all of output whatever its growth rate and to handle only the supply side of the growth problem. This is the usual way problems of growth are handled. There may be a great deal of justification for such a procedure in studies of underdeveloped economies, but I wonder if it might not be more profitable in analyzing problems of growth in advanced economies to work simultaneously on the demand and supply side. We really do not have much in the way of a theory of growth of demand, and we need one if for no other reason than to achieve Denison's 3⅓ per cent rate of growth. I can think of nothing more fruitful than to have a session at some future meeting that would take up the topic: How can we increase the lagging rate of growth of demand and supply?

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[1] During our session there was some discussion and criticism of one of my conclusions. Unfortunately, I was not given a chance to prove my point then; so I have included a few equations substantiating my point.

ARTHUR SMITHIES: Since commendation of Solow's paper would be superfluous, I shall confine myself to a few critical comments.

1. *The Concept of Potential Output.* Solow defines potential output as a function—in this case a Cobb-Douglas function—of the stock of capital or "the equivalent stock" and the total labor force. This concept implies that it is feasible to employ the entire labor supply in conjunction with the entire stock of capital. There are circumstances in which this may not be feasible; and consequently the concept of potential output needs to be further refined.

Solow himself has advanced the idea that a sharp distinction should be drawn between the substitutability of factors before and after investment. Cobb-Douglas may prevail before the fact, and after it something more like fixed coefficients may be closer to the mark. In that event, the maximum feasible level of employment will be determined by both the size and the character of the capital stock and that level may be less than full.

Even allowing for full Cobb-Douglas substitutability, the question of feasibility still arises. If there is a real wage below which labor is not prepared to work, full employment of labor requires that the stock of capital or the equivalent stock be adequate to yield a marginal product of labor that will be at least equal to that real wage under full employment conditions. Labor in fact is extremely unwilling to accept real wage reductions whether achieved by lowering money wages or by raising prices. If full employment is achieved by expanding money demand under conditions where the marginal product of labor is inadequate in the above sense, an initial price increase will be followed by efforts of labor to raise money wages in order to restore the loss of real wages. In short, the consequences will be inflationary. The country may be willing to submit to some degree of inflation in the interest of full employment. But if so, this should be recognized explicitly and the concept of potential output should be revised to take these considerations into account.

2. *The Estimate of Actual Output.* Solow's method of estimating both actual and potential output is to employ a production function that consists of this formula for potential output multiplied by a function of the labor unemployment percentage. This function is estimated from time series of the equivalent stock of capital, the labor force, and the unemployment percentage. I do not know—nor does anyone else know—what quantitative errors are involved, but the procedure is open to objection on grounds of principle.

What is implied is that if there is an addition to the labor force that has never been employed, the Solow formula would predict an increase in actual output. The formula is based on data from 1929 to 1960; and to use the labor force in the thirties as a variable to explain actual output seems to be stretching things too far. But how much difference this makes to the estimate of the elasticities of capital and labor in the production function, I cannot say.

The difficulty that Solow is trying to surmount arises from the lack of an adequate statistical measure of unemployed capital or unused capacity. He tries to get around this by assuming that the unemployment of both capital and labor can be reflected by including the unemployment of labor as a variable in his production function. My own feeling is that there is no adequate substitute for a direct measure of unemployed capital. With such a measure one could work straightforwardly with employed labor and employed capital as the basic variables.

3. *"Embodied" Versus "Disembodied" Technical Change.* The question whether productivity change must be embodied in new investment raises a host of issues that I can do no more than touch upon. Solow is like a Pied Piper who can play different tunes. We all followed him in the disembodied direction in 1946; and now we are following him in the "vintage" direction. The truth probably covers the entire spectrum between the extremes. Some productivity increases, resulting, say from improved management or labor skills, may be attainable with only minor adaptations of the existing stock of capital, involving nevertheless some investment. For others new equipment may be necessary; and old equipment may be useless. With an increased rate of growth as the objective, the problem of private investors or state planners is to select among the various technical possibilities those that will maximize the rate of growth of the economy, which is the product of the marginal saving ratio and the marginal output-capital ratio.

Perhaps the whole problem is too complicated for adequate reflection in a formal model. In that event, we could do worse than reread Adam Smith (or possibly read him for the first time). In Book I, he said that the division of labor was the mainspring of economic progress; and in Book II, that accumulation was a necessary condition for increased division of labor. How far have we got beyond that?

INTERNATIONAL TRANSMISSION OF BUSINESS CYCLES: PROBLEMS AND POLICIES

THE POSTWAR BUSINESS CYCLE IN WESTERN EUROPE

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I feel somewhat handicapped in discussing the business cycle in the United States because I do not come armed with any elaborate statistical analysis. I am afraid, therefore, of giving the impression of approaching the subject with a divining rod. The fact is that business cycle research is not a highly developed activity in Europe. There is no opposite number to Geoffrey Moore, establishing the leading and lagging series, nor to Julie Shiskin, giving the count-down on the latest month's statistics. The limitation of data, perhaps, is partly responsible for the neglect of cycle measurement but I think it is not the essential factor. It is rather that the idea of the business cycle is not à la mode; it is considered a bit prewar as an analytical concept and not particularly applicable to the present-day problems of the European economy. Though I often have wished for better economic indicators, I must say that I am in sympathy with this point of view. For, while the fluctuations in the United States may still look like business cycles, it seems an inappropriate label to apply to the fluctuations in Europe over the past fifteen years.

The outstanding feature of the European economy since the war has been the high rate of expansion and the high degree to which full employment has been maintained. The record has been in sharp contrast to prewar experience, as has the fact that pauses in the expansion, or setbacks to it, have been infrequent and mild.[1] Thus, there is no doubt that Europe has had waves of expansion. What is in question is the recession phases of the cycle.

Taking Western Europe as a whole, there were two periods of pause, corresponding roughly to the years 1952 and 1958. It may be noted that the 1948-49 recession had little effect on production in Europe. One can find repercussions in a few countries, principally Belgium and Switzerland, but generally the movement was so small and its duration so short as to have little significance. I would attribute this absence of recession in the first five years after the war to two influences: the maintenance of controls and American aid. These factors gave a breathing space for the reconstruction of the supply potential of the economy, during which the inflated level of money incomes and the excess liquidity in the system were prevented from erupting into a speculative boom. This in turn meant that there was no day of reckoning when, because prices had overshot the mark, shortages suddenly disappeared and swollen inventories had to be digested.

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[1] The record is well set forth by Angus Maddison: "The Postwar Business Cycle in Western Europe and the Role of Government Policy," Banca Nazionale del Lavoro, *Quar. Rev.*, June, 1960.

To return to 1952 and 1958, these were both years when the economy was in a definite lull. I had no hesitation in calling them recessions at the time and I have none now, but they were of a quite mild order. The real GNP for the OEEC area, for example, increased by 2.7 per cent in 1952, compared with an expansion of 5.5 per cent in 1951 and 1953, while there was a rise of 1.8 per cent in 1958, compared with gains of 4 per cent in the years just before and after. No doubt these figures show the picture somewhat better than it was because the timing of the pauses did not correspond exactly with calendar years and did not coincide precisely for all the countries. Nevertheless, actual declines in real GNP for the individual countries were rare and small; in 1951 there was only Sweden (−0.4 per cent); in 1952, Denmark (−0.2 per cent) and the United Kingdom (−0.5 per cent); and in 1958, Belgium (−1.7 per cent) and Norway (−0.2 per cent).

Some indication of the differences in timing of the recessions can be obtained from the movements of the monthly industrial production indexes. They show (see Table 1) that the actual months of pause or decline in industrial production were primarily in 1951 for Germany, Italy, and Holland and primarily in 1952 for France, Belgium, Sweden, and the United Kingdom. I do not attach too much importance to these differences, however, as the rise in production for the former group of countries in 1952 was not substantial and as there were already signs of slowing up for the latter group in 1951. For the OEEC as a whole, the production index stopped rising early in 1951, had a dip in 1952, and began a new sustained expansion early in 1953.

Similarly with the recession of 1958, the beginning of the pause in production was strung out among the countries through a good part of 1957 and on into 1958, with some significant exceptions that I will take up later. As the recession for most countries took the form of a period of level industrial production (rather than a decline), the turning points are rather hard to fix. In terms of the sense of the market, however, I know there was no feeling of recession until late in 1957 and no feeling of renewed expansion until the beginning of 1959. I may say, also, that there was not much bounce to the economy even in 1957.

TABLE 1

RECESSIONS IN INDUSTRIAL PRODUCTION IN WESTERN EUROPE

Country or Area	1951–52			1957–58		
	Timing	Duration in Months	Industrial Production Behavior*	Timing	Duration in Months	Industrial Production Behavior
OEEC	Jan. 52–June 52	6	– 8%	Mar. 58–Jan. 59	10	level
United Kingdom	Sept. 51–July 52	11	– 8	Jan. 56–Oct. 58	34	level†
Germany	June 51–May 52	12	level	Feb. 58–Sept. 58	8	level‡
France	Feb. 52–Jan. 53	12	– 8	May 58–Jan. 59	9	– 5%
Italy	June 51–Nov. 51	6	– 5	May 57–May 58	13	level
Belgium	Sept. 51–Jan. 53	17	–10	June 57–Feb. 59	21	–11%
Netherlands	Apr. 51–Dec. 51	9	– 7	Mar. 57–Dec. 57	10	– 6%
Sweden	Sept. 51–May 53	21	– 5	Feb. 58–Dec. 58	11	level
Denmark	Apr. 51–July 52	16	– 8	July 57–July 58	13	level§
Norway	July 51–Sept. 52	15	– 3	June 57–Jan. 59	20	level
Austria	Apr. 52–Dec. 52	9	– 6	Feb. 58–Dec. 58	11	– 2%

* Declines computed from smoothed series.

† Within this period there was a minor rise and decline of production.

‡ There was also a period of pause in the second half of 1956 as a result of strong restraining measures taken by the authorities.

§ There was an additional period of level production in Denmark from July, 1954, to May, 1956, following the exchange difficulties of mid-1954.

The 1952 Recession

I turn now to the more interesting question of the fundamental nature of these recessions and how they came about.

The pause of 1951-52 stemmed from the Korean incident. As in the United States, there was a wave of protective buying by both enterprises and consumers, though in many countries it was less intense and less immediate. I believe this might have been passed over without a significant let-up in the pace of expansion if it had been all that happened. For, also as in the United States, there was a significant (though smaller) increase in rearmament programs which might have largely offset the reaction of private demand—as it did in the United States. But balance-of-payments difficulties intervened which required a sharp shift to policies of restraint and it was this policy shift that was decisive in causing a pause in the pace of expansion. This can be seen not only in the general result but in the timing of the pause in the important countries. (A further motive for policy restraint in some cases was the need to make room for larger defense expenditures in an already tight supply situation.)

The first case was Germany, which got into a balance-of-payments crisis as early as the fourth quarter of 1950. It resulted from a large increase in imports, facilitated by the adoption of the OEEC Code of Liberalization earlier in the year. Germany quickly exhausted its quota in the EPU and, as it had no reserves, something had to be done. It applied for a special credit from the EPU and undertook, in conjunction with this credit, to moderate its import program and to adopt measures to restrain internal demand. The measures were effective in both respects: whereas the volume of imports had risen 40 per cent in 1950, they were up only 6 per cent in 1951 and the balance-of-payments situation was soon in a healthy condition.

In the second half of 1951, first the United Kingdom, then France, were beset by balance-of-payments difficulties. In these cases the volume of imports rose much more moderately but was coupled with a severe adverse change in the terms of trade. As a consequence, imports jumped by more than 40 per cent in value in 1951 over 1950 and rescue operations became necessary. The United Kingdom sharply reduced its liberalization percentage in November, 1951, and February, 1952; France suspended liberalization entirely in February, 1952; and both countries initiated measures to restrain over-all demand. These actions effectively dampened the expansion of the economy and eased the balance-of-payments crises.

I need not recount the experience of the other countries; some had an independent reaction to the Korean incident while others were carried along by the large countries which are their principal trading partners. In the event, the lull of 1952 became general.

It is interesting, however, to note how the pause became effective. Taking the OEEC as a whole, gross fixed investment in volume terms, apart from housing, was held at the level of the previous year and consumers' durable expenditures nearly so. Inventory accumulation returned to about a normal level, at half the rate of the previous year, while both imports and exports showed only minor increases in contrast to the large gains of the previous two years. Though policy restraint to correct the balance of payments was the main cause, one can see that the reaction from the Korean buying wave was also a factor in the recession. The declines in industrial production were concentrated in the soft goods industries, principally textiles and some branches of the chemical industry; both the basic metals and metal fabrication industries showed a level movement rather than a decline.

Thus the recession was of an entirely different kind from the U.S. recession of 1954. The latter was strictly a demobilization recession brought about by the reduction of defense expenditures that became feasible with the ending of the Korean war.

The 1958 Recession

As to the recession of 1958, it was an entirely different affair from that of 1952 because it did not have its origins in any shock event, like the outbreak of the Korean war. One may say, therefore, that it was the first normal recession of post-Keynesian Europe. How and why did it come about?

The years 1953, 1954, and 1955 were years of exceptional economic expansion; the rise in the real GNP for the OEEC averaged 5½ per cent and in 1955 was over 6 per cent. In the course of this expansion all the industrial countries, except Italy, reached a position of excessive total demand and overfull employment, which produced inflationary pressures and, in many cases, balance-of-payments difficulties. The recession came about through the gradual efforts of the authorities to curb this excess demand situation by shifting from a policy of stimulation to one of restraint. This necessarily involved a period of pause in the expansion to ease the pressure in the labor market.

The emergence of excess demand and the initiation of policy measures to counteract it were strung out among the countries over a considerable period of time. The first case was that of Denmark where, with the help of exuberant negotiated wage increases, the pot began to boil as early as the first half of 1954. By the middle of the year the balance-of-payments difficulties were quite serious and strong restrictive measures were undertaken. This action stopped the expansion: industrial production was about level between July, 1954, and May, 1956, while the rise in the GNP was sharply reduced in 1954 and there was no rise in 1955. The need for so extended a period of restraint, given the fact that there cannot be said to have been excess demand after the early months of 1955, must be attributed to the tendency of wage-cost inflation to frustrate the policy efforts to restore a sound balance-of-payments situation and thereby allow a new period of expansion. This policy was eased in mid-1956 and production responded until mid-1957, when it was again necessary to curtail demand.

Space does not allow me to review the experience of all the countries individually but I would like to say something about the large countries. Signs of strain in the United Kingdom were evident by the end of 1954 and monetary restraint was initiated early in 1955. However, the April budget of that year was definitely an optimistic one and even at the time seemed risky. The inevitable happened and sterling was showing significant weakness by the third quarter of the year. This made a firmer policy of restraint necessary, signalized by the unusual step of an autumn budget. Policy was oriented toward restraint throughout 1956 and 1957, with the final tightening of the vice coming in September, 1957, in response to the sterling crisis of that time. In the United Kingdom, also, persistent wage-push interfered with the restoration of a sound balance-of-payments position and dragged out the period during which a restrictive policy was necessary.

TABLE 2

APPROXIMATE TIMING OF EXCESS DEMAND 1954–57

Country	Approximate Length of Time	Approximate Date
Austria	1 year	during 1955
Belgium	1 year	early 1956 to early 1957
Denmark	1 year	early 1954 to early 1955
France	2 years	early 1956 to 2nd quarter 1958
Germany	2 years	1955 and 1956
Italy	not significant	
Netherlands	2¼ years	late 1954 to beginning 1957
Norway	2¼ years	early 1954 to end 1956
Sweden	2½ years	early 1955 to mid-1957
Switzerland	1½ years	end 1955 to mid-1957
United Kingdom	1½ to 2 years	late 1954 to mid-1957

SOURCE: *The Problem of Rising Prices* (OEEC, 1961).

The economy limped along without significant expansion for almost three years, and if one calls this a recession, it was really continuous from January, 1956, to late in 1958. There was a minor rise and decline in production from the autumn of 1956 to the autumn of 1958, but the movement was hardly enough to be considered a separate cycle.

Excessive demand pressures in Germany appeared about the beginning of 1955, with signs of a speculative boom developing and a general tightness in the labor market. The unemployment figures for that period may seem rather high but this was due to the continuous inflow of refugees from the east who could not be immediately integrated into the labor force—for lack of housing, among other things. The authorities, therefore, began in 1955 to curb demand, largely through monetary policy but also by allowing a large budget surplus to accumulate. Germany was thus one of the few countries that acted against inflationary pressures without the spur of a threat to the balance of payments. The measures were intensified in the first half of 1956 and led to a definite lessening of the pressure after the middle of the year. Industrial production showed no rise in the second half of 1956 and, although it rose again in 1957, a further period of pause occurred during the first nine months of 1958. The calming of the boom can be seen in the tapering-off of the annual increase of the GNP (constant prices) from 1955 to 1958: 11.5, 6.9, 5.4, and 3.3 per cent. The last year was the recession.

In France excess demand erupted in the early months of 1956 and, largely because of the inflationary financing of the war in Algeria, was very much more severe than in the other industrial countries. A large variety of measures were taken throughout 1956 and 1957, without getting at the heart of the matter however, and a huge deficit in external payments persisted despite a de facto 20 per cent devaluation of the franc in the autumn of 1957. The French situation illustrates the fact that output can continue to rise in the face of quite severe inflation —provided there is acquiescence in a drastic loss of reserves—as the expansion went on heartily through 1957. However, the kitty finally ran out and at the end of 1957 resort to international credit became necessary. A stabilization program was instituted in conjunction with this borrowing, the essential elements of which were reducing the budget deficit to manageable proportions and stopping the credit expansion. This stabilization effort was consolidated by a second series of measures at the end of 1958, when the franc was again devalued and put on a solid footing.

The reaction of the economy to forceful restraining measures was immediate. Industrial production was actually declining moderately in the period May, 1958, to January, 1959, and the real GNP showed only small rises of 1 and 2 per cent in 1958 and 1959, compared with increases of about 6 per cent in the years just before and just after.

The other industrial countries all fit into the patterns indicated by these examples and all oriented their policy toward restraint in 1955 and 1956. Switzerland and Belgium had excess demand without attendant external disequilibrium, while the rest had the additional incentive of balance-of-payments troubles in their efforts to dampen the pace of expansion: Austria, Norway, and Sweden in 1955 and the Netherlands throughout 1956 and the first half of 1957.

Seeing that the authorities in most countries were pursuing restrictive policies as early as 1955, one may be prompted to ask why the recession was delayed until 1958. The main reason, of course, is that generally the shift to a restraining policy was a gradual one, with the first halting steps being strengthened again and again as they were seen not to produce the desired results. Hence, it is not that restraint took a longish time to become effective but that it took a longish time for the authorities to venture effective restraint. This caution is understandable, as there was a genuine desire to avoid unemployment and a very human reluctance to kill prosperity by too much zeal.

A further reason for the delay of the recession was the Suez incident at the end of 1956. This gave an added fillip to prices and demand at a time when there were definite signs of the expansion leveling out. It has been my own belief that Suez pushed the year of pause in Europe forward to 1958, instead of it occurring in 1957. In the United States, also, it seems to me that Suez delayed the recession of 1957-58 by about six to eight months.

However this may be, 1958 did turn out to be a significant year of pause for all countries. In all cases there was a decided slowing up in the rate of expansion of total output or a small decline; for the OEEC as a whole the increase in real GNP was 1.8 per cent in 1958 as against 4.2 per cent in 1957. Among the components of the GNP, also, the pattern was generally one of smaller increases rather than actual declines; aggregate defense outlays fell and housing construction was at the same level as the previous year but for both of these components the result was determined directly by policy action.

These, then, are the two postwar recessions and one may ask whether they can properly be looked upon as the contraction phases of the business cycle. I have already indicated that I am reluctant to do so. This is not because they were periods of pause in a wave of expansion instead of actual downturns in activity, for I do not think it odd to call such deviations from trend recessions. Rather, it is because the idea of the business cycle implies fluctuations that are essentially self-generating and spontaneous and not, as were these recessions, policy-determined. In neither case was there the typical sequence of expansion becoming a boom which itself created distortions that caused the recession. In the 1951-52 case there were distortions on the side of the balance of payments, but these came from a shock to the economy from the political sphere. In the 1957-58 case there was not much in the way of distortions in the economy; restraining action was taken precisely to prevent their arising to a serious degree.

Hence, it is because the recessions followed from acts of policy that I think the term business cycle does not fit. They came about more or less as planned; their results were broadly accepted as desirable; there was little fear that they would produce a deflationary spiral; they did not lead to a serious rate of unemployment; and they ended, likewise through acts of policy, when the authorities considered that the economy could safely resume expansion.

Of course, these changes in policy emphasis did not work with mechanical precision and with instantaneous effect. But it is apparent that neither the lulls nor the renewed expansions were self-produced. This does not imply that the economy has lost the usual cyclical forces tending to periods of deflationary spiral or overexpansion but that stabilization policy has contained such forces within much narrower limits than formerly. What is more, it appears that the pursuit of stabilization has tended to reduce the strength of the underlying forces. I believe that had the idea of the business cycle not existed, it would hardly have been invented to describe the postwar fluctuations in Europe. I emphasize this point because I believe it involves more than terminology.

Fluctuations in a Full Employment Economy

We may now consider whether the favorable postwar record of Europe with respect to economic fluctuations can be expected to continue in the future. This question is often asked in one form or another and I have always been hesitant about answering because it seems to me that any sensible answer must be on a somewhat abstract plane. But it is a useful question for focusing on the understanding we have gained by postwar experience of the ability of the authorities to prevent fluctuations in an industrial economy under present-day conditions.

I assume that the authorities will continue to aim actively at maintaining full employment by appropriately managing the level of total demand but also that they will temper their actions with a view to achieving reasonable price stability and external balance. And, as a group of sovereign nations is involved, I assume reasonable co-ordination of policy and standards of international good behavior among them. The question then is, under what conditions may the authorities be unable to maintain the economy steadily at a position of full use of resources? To remain strictly in the economic sphere, I leave aside shocks to the economy that may result from political or social disturbances.

First of all, it is reasonable to expect deflationary spirals to be avoided. In other words, if the economy comes to a pause or a dip in activity, I believe experience shows that the authorities can prevent it from becoming cumulative. This seems clear not only from European experience but also from American; it is the most important difference between the prewar and postwar management of the economy. Of course, one cannot preclude that the authorities might fail to act at some time or other, but it appears that the pressures for action will be very great when the signs of recession are evident.

As a corollary to this, one can expect that policy can and will be effective in preventing the economy from lingering in a state of semiequilibrium at a level appreciably below the full use of resources. The exception, which I will come to in a moment, is when action must be inhibited by an adverse balance-of-payments position.

It would be nice to believe, similarly, that bouts of extreme inflation are also a thing of the past. Experience shows that they are always caused by excessive deficits in the public finances and that the authorities have the powers to avoid them if they have the will to use those powers. To predict that governments will always be strong in this regard, however, is more than I would venture, especially as pressures from the public are not always on the side of the angels.

With regard to milder fluctuations, I think the case is much different because I cannot see the practical possibility of their being eliminated. In fact, I expect that future experience in Europe may be less favorable than that of the postwar period thus far. Three basic difficulties can be envisioned which may cause such fluctuations.

1. Fluctuations can be anticipated because the ability of the authorities to manage total demand, in the future as in the past, cannot be either precise or instantaneous. Hence, while they may seek to keep demand from becoming either excessive or inadequate they are likely fairly often to be somewhat off the mark. There are two reasons why this must be expected. The one is that there is an element of trial and error in the use of policy measures to restrain or to stimulate the economy because the reaction of the market to the measures is not mechanical and exact. While the measures taken to prevent excess demand in 1955-56 were obviously not vigorous enough, for example, I believe it was not possible for one to say exactly what would have been the right dosage of restraint. It is inevitable, too, that political considerations will sometimes play a part in policy decisions.

The other reason is that important changes in policy usually cannot be taken until the trend of developments in the economy is quite clear. This means necessarily a lag between market behavior and policy action. In practice, of course, caution and hesitation often delay action, but in the best of circumstances there is an element of uncertainty in analyzing the situation. It is sometimes thought that forecasting, with the help of data like anticipated investment outlays, can be used to bridge the gap but I believe that the process of decision making must rest on firmer ground.

I do not mean to imply that this problem must lead to large fluctuations in the level of activity. On the contrary, the surprising thing about postwar experience is how much room there is for trial and error in policy measures and how much time there is for taking remedial action without alarmingly adverse effects.

2. In addition, the necessity may arise for a substantial shift in the

use of real resources because of a change in the pattern of demand; the economy may then have to operate below its full potential while this shift is being effectuated. The clearest case of this kind since the war is the U.S. recession of 1954, which involved a shift from defense to civilian output. An active stablization policy can facilitate the shift and limit its repercussions on the rest of the economy but it cannot prevent the shift itself—in fact, it would be undesirable to try to do so.

In Europe there has not been an instance of this kind large enough to affect the general conjuncture significantly, though perhaps the 1952 recession was partly of this character due to the weakened demand in the nondurable goods industries. The demand pattern has been far from static and in particular countries textile, coal, shipbuilding and shipping provide striking examples of industries that have been forced to contract. But while these contractions have sometimes had a regional impact, the high degree of flexibility shown by the productive system, benefiting from a rapid rate of growth, has given reasonably smooth transitions. For the future, however, it would be surprising if more difficult tests did not arise, perhaps at a time when the general demand pressure may be less intense. For example, the very rapid growth in the automobile stock must one day taper off; housing requirements may become more fully met; and, regarding total investment, it cannot continuously rise as a proportion of gross output. There are serious efforts in some countries to avoid such difficulties by planning but it seems to me that a potential problem remains which is apt to arise from time to time.

3. The third type of difficulty to be expected is that associated with an independent disequilibrium in the balance of payments. I stress independent because I mean, say, an external deficit that is not merely a manifestation of a general excess of demand; thus, it is a persistent deficit (or surplus) occurring at a time when demand is not out of line with domestic resources. Analytically, it is that the cost and price level has somehow reached a point at which external payments exceed receipts at full employment levels of demand. A deficit of this kind means that the authorities may have to hold some slack in the economy in order to secure a workable balance-of-payments equilibrium. A persistent surplus, on the other hand, greatly complicates the restraint of inflationary pressures. Such balance-of-payments troubles have been a problem in the past decade and it seems likely that they will continue to be so.

This problem may arise from a variety of causes. (1) For example, substantial demand inflation may raise the cost and price level to a point that results in an external deficit even after the excess demand has been eliminated by appropriate monetary and fiscal measures.

There have been obvious cases of this kind. (2) In theory, it may arise also because of differences in the rates of productivity increase among the trading countries, or because of an adverse change in the terms of trade. The latter was significant at the time of the Korean war but since then changes in the terms of trade have been favorable to Europe. As to productivity changes, the European economies have seemed to have sufficient flexibility to adjust to them when wage-push has not obstructed the adjustment process. However, it is possible, perhaps probable, that the exchange rates fixed in the earlier postwar years would have implied some payments disequilibrium as reconstruction proceeded in the various countries. (3) Finally, the problem may arise from persistent wage-cost inflation which pushes the price level of a country out of line with that of its trading partners. This has been the basic cause of difficulties for a few countries, not only because it creates external disequilibrium, but because it blocks readjustment. The outstanding lesson of postwar experience for the management of a full employment economy has been, in fact, the supreme importance of appropriate wage movements—a lesson that is evident from the successes as well as from the failures.

Such independent external imbalances are likely to pose problems for the authorities in the future because there is no easy way to correct them by policy action—given the fact that the cost and price level is rather insensitive to mild deflationary measures. In extreme cases, of course, currency devaluation has proven to be a necessity. With milder imbalance, however, I believe the authorities are, properly, not prepared to sacrifice the advantages of exchange stability. No country has undertaken a small devaluation and the consequences of small revaluations have not been such as to encourage further experiments.

Policy action has been moving in two directions in trying to deal with this problem. One is by attempting some management of particular types of international transactions such as long-term investment flows and government transactions. The other is to establish wage policy as an essential means of preventing and correcting such imbalances in view of the fact that a basic source of the trouble has been the effect of wage bargains on the cost level. I strongly share the view that some government responsibility for the wage negotiation process is required to deal with the matter. But one must admit that considerable political skill and much public understanding are needed to assure successful wage policy.

Differences in European and United States Experience

The view I have presented of Europe's prospects in controlling economic fluctuations is an optimistic one, as it implies that the authorities

TABLE 3

COMPARISON OF RECESSIONS IN EUROPE AND THE UNITED STATES

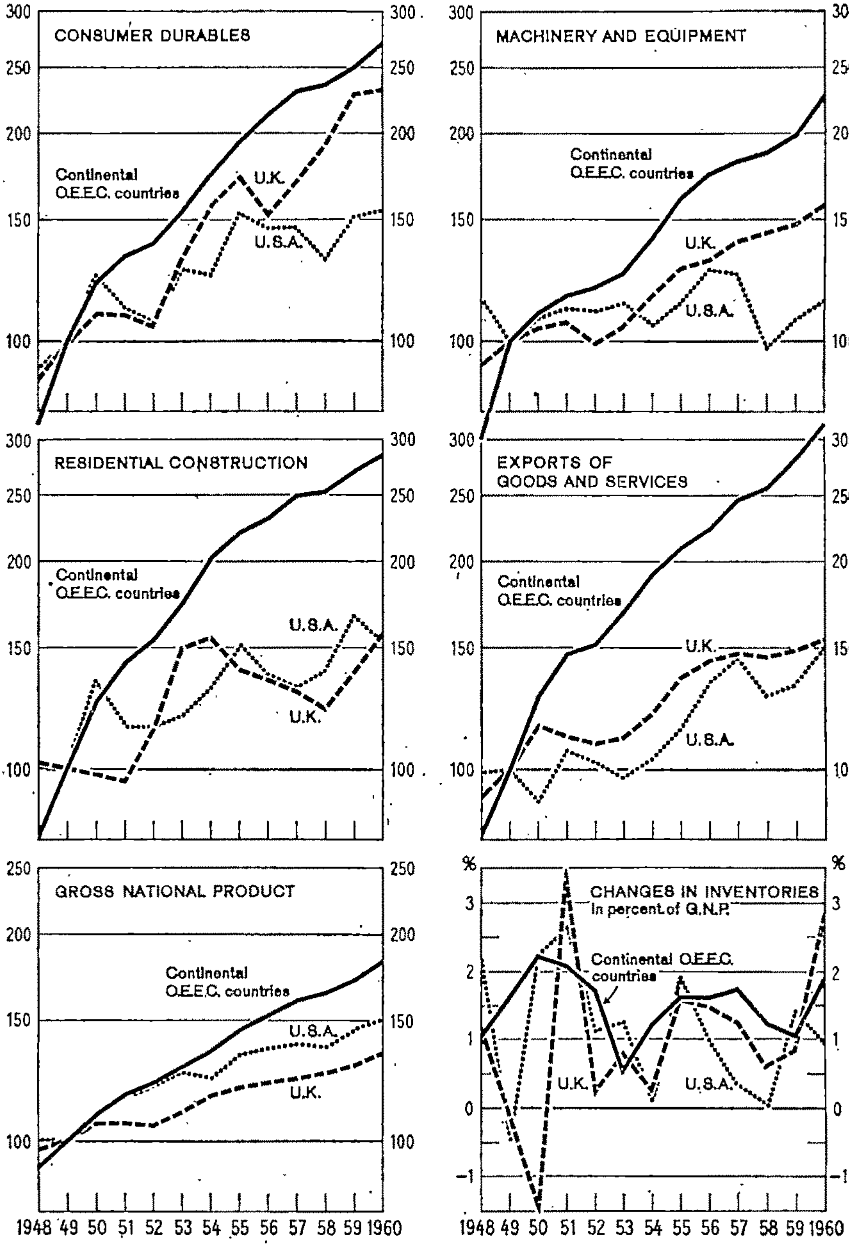
(Figures show percentage changes at constant prices)

GNP and Components	OEEC 1952 over 1951	United States 1953–54 over 1952–53	OEEC 1958 over 1957	United States 1957–58 over 1956–57
Private consumption	2.5	1.7	2.7	1.5
Nondurable and services	2.6	1.5	2.6	2.4
Durable	2.5	3.3	4.4	− 4.2
Public consumption	11.2	−0.9	1.6	2.8
Defense	20.4	−6.8	−2.7	− 0.3
Civil	6.3	8.4	3.9	6.1
Gross domestic fixed capital formation	1.7	2.9	2.4	− 7.0
Residential construction	9.8	3.7	0.0	− 1.9
Other construction	−3.3	6.4	3.8	− 3.1
Machinery and equipment	0.7	0.0	2.7	−12.7
Exports of goods and services	1.0	3.7	2.5	− 7.0
Imports of goods and services	0.3	0.0	0.7	4.5
Gross national product	2.7	−0.2	2.3	− 1.4
Inventory increase: Absolute year-to-year change as % of GNP	−1.0	−1.6	−0.5	− 1.2

will have fair success in managing the usual cyclical forces. The contrary view often heard is that Europe has been having a long postwar reconstruction boom and that once it is over the business cycle in Europe will be like that of the United States. I would like to look at U.S. experience from that viewpoint.

It is evident that Europe has been more successful than the United States in maintaining the economy close to the level of full use of resources. However, I think the contrast is often exaggerated. To say simply that the United States has had four recessions since the war while Europe has had only two, which were really only pauses, is to ignore some basic differences in the situations of the two areas. The recession of 1948-49, for example, is not a significant blot on the U.S. record; it was a rather minor period of adjustment to have occurred after a major war and I believe Europe might have experienced much the same thing had not more severe shortages in Europe precluded relaxation of controls soon after the end of the war. Similarly, the recession of 1954 does not prove much. The transition after the Korean war was well handled by the United States and I do not see that Europe could have done much better if it had been as deeply involved in the war. The contrast, therefore, comes down to the last five or six years,

GROSS NATIONAL PRODUCT AND ITS MAIN COMPONENTS
in continental O.E.E.C. countries, the U.K. and the U.S.A., at 1954 prices.
Indexes 1949 = 100 (logarithmic scale)



when there were two recessions in the United States as against one interval of pause in Europe.

It is evident that the various categories of investment and consumers' durable expenditures have been more volatile in the United States than in Europe. This does not explain anything; it only records the greater fluctuations in the United States. What is more striking if one charts the data for both areas, however, is that the trend in Europe has been sharply upward whereas it has been rather flat in the United States. Hence, when policy restraint was imposed in Europe it tilted the curves from an upward to a horizontal position while in the United States they went from horizontal to down.

The upward trend of the European economy, given the physical possibility for it, is attributable primarily to the continuing policy stimulus to demand in key sectors such as housing, public enterprise investment and private plant and equipment investment with the objective of attaining high employment and growth. The goal of full employment is firmly held by the authorities and the public alike and there has been an effort to maintain it by calling upon existing policy instruments and by devising new techniques in the light of changing circumstances to avoid excesses of demand as well as weaknesses. It must be said in addition that, with a favorable international competitive position, the strong pull of exports in most countries has made the job easier—in fact, it has often led to the opposite problem of demand pressures. It has been enlightening to see that, under these conditions of a stimulative climate of demand, the volatile components of output have not been so volatile.

We may ask now whether stronger and quicker policy action in the United States would have limited or avoided the recessions of 1957-58 and 1960-61 or whether there were supply distortions that had to be corrected. The case of 1957-58 is difficult to judge because it does seem that capacity in some industries had become overexpanded in the investment boom of 1956. On balance, however, I am inclined to believe that this condition was not sufficiently general to require a downturn in activity so as to allow time for a shift in real resources from oversupplied to undersupplied sectors of the economy. Had total demand been supported in the spring and early summer of 1957, the production curve would probably have been quite different. As to 1960, there were no distortions in the structure of output—although the steel strike was hardly a contribution to stability. Indeed, the mildness of the recession indicates that it was the general failure of demand to continue rising that led to the easing-off of activity. In my opinion, in their deep concern over the balance of payments and possible renewed inflation, the authorities underestimated the restraining influence of the growing budget surplus.

Stabilization policy in the United States has worked under several handicaps. Without meaning to be paradoxical, I would say that the belief in the business cycle is itself a significant obstacle to effective action. The sharpness of changes in inventories and in equipment outlays reflects a desire of management not to be caught unawares by recession and to take full advantage of the expansion phase of the cycle. The tendency for prices to rise before full use of resources is reached is perhaps also a defensive reaction against the expectation of subsequent recession. These tendencies have confronted the authorities with inflationary and speculative tendencies at an earlier stage in the expansion than has been the case in Europe.

Acceptance of the cycle is shown also in the attitude of an influential body of opinion, including Congressional, that it is somehow more moral to let a recession cure itself than to intervene actively. Of course, this has not prevented action from being taken. In every recession the authorities have moved to limit the downturn and stimulate an upturn —without waiting for Say's Law to assert itself. But one senses that it has restrained both the timing and the vigor of policy measures.

Another handicap is that the aim of full employment has not had as high a priority in public thinking as in Europe. It is not that some other goal has been put in its place but rather that stabilization policy is hemmed in by restraints on its freedom of action. The ceiling on the national debt, the aim of a balanced budget, and even the interest limitation on government securities are examples of such restraints, as is a general distrust of governmental initiative in managing the economic climate. They are perhaps most important when they affect the flexibility of fiscal policy but they have a broader influence in limiting the use of policy instruments. It is significant that the new Administration, which was expected to have a pragmatic approach to policy problems, has hardly yet felt able to make a straightforward statement on budgetary policy and that the fiscal stimulus to expansion that has been needed in the past year might have been quite small except for the sad necessity of increasing defense expenditures.

On top of all there has been the very real problem of the balance-of-payments deficit, which has introduced the necessity for caution into policy considerations. As it stands today the United States external position is one in which a basic deficit is to be expected at full use of internal resources. I have already indicated that this is a situation that poses policy difficulties for any country; at the present time, the disturbed international picture and recent foreign exchange experiences accentuate the difficulties. The United States does not have a special dispensation for overcoming this problem easily.

The causes of the United States external deficit have been more complex than similar cases in Europe. The recovery and growth of the European industrial potential was itself bound to increase the competition facing American producers in world markets, including the United States market. Heavy military and aid expenditures abroad have been another contributory factor. But, in addition, wage-cost inflation and inflation of other costs as well have led to a rise in industrial prices relative to prices of competing industrial countries, so that price movements have worked against the requirements of external balance. The same mechanism has operated in several countries in Europe.

To conclude, therefore, I believe that United States experience fits into the same analytical pattern as European and does not demonstrate that future fluctuations in Europe must have an essentially cyclical character. Of course, neither economy can be managed without realistic policy measures; and for the authorities to maintain full use of resources requires some adaptation of labor and business behavior to the needs of price and external stability.

ECONOMIC INSTABILITY IN AN INTERNATIONAL SETTING

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During the past decade the world economy has shown remarkable stability. Broadly speaking, unemployment was a minor problem during the fifties and, apart from the consequences of the Korean war, price fluctuations have also been relatively small, although it is true that the general upward drift of price levels in the industrial countries has not been fully arrested, and that the terms of trade of many primary-producing countries have tended to decline during the second half of the decade. It is an indication of the success already achieved that in addressing oneself to the question of measures to improve the stability of the world economy in the years to come, one is speaking in large part of effects which twenty-five years ago would have been considered to be of the second order of smallness.

The fact that we have enjoyed this degree of stability is no ground for complacency. It would seem definitely too early to say that we have mastered the control of the business cycle. New problems are, moreover, arising. Perhaps the most important of these follows from the increasing international mobility of capital which, in a world of many convertible currencies, is creating a new environment for the conduct of domestic stabilization policy in the industrial countries. New forms of international co-operation may be required for the realization of the potential benefits and for the suppression of the harmful side effects of such institutional changes.

The problem of economic stability may be approached in a number of ways. Perhaps the most important point to remember is that the approach should not be too narrow. It is easy to slip into the error of discussing *one* aspect of instability and, having found reasons for dismissing it, to think that one has covered the subject as a whole. In this presentation we shall deal with three aspects of the problem of short-run international instability: (1) the trade propagation or transmission mechanism, by which shocks that originate somewhere in the system are passed on through the international economy; (2) the cyclical and other short-run variations in domestic aggregate demand in the industrial countries; and (3) the international movements of short-term capital. We do not discuss a possible fourth subject, supply-fluctuations in the output of primary products, because their destabilizing impact falls mainly on the countries concerned rather than on the world economy.

I. *The Transmission Mechanism*

Our study of the transmission mechanism is intended to assess the impact of economic fluctuations in one region on the remainder of the world economy. To do this we need a manageable set of estimates of the quantitative income-trade relations as they seem to have operated in recent years. With respect to the construction of what is in effect a world economic model we are, however, still in the impasse about which one of us complained ten years ago in connection with an earlier attempt to build a world model: we lack the national economic models that could be hooked together into a world model by linking their international trade connections.[1] Since then even less progress has been made than might have been hoped in the construction of national models, and it is just as necessary now as it was then to proceed directly to the construction of a broad international model. In doing so we have been even more boldly aggregative than on the earlier occasion, conceiving the world in terms of only three regions: the United States and Canada, the other industrial countries, i.e., Western Europe and Japan, and the primary-producing countries, and we have made certain very broad assumptions about the behavior of the economies of these regions.

One of the difficulties in any attempt to summarize the world economy in a small number of relationships is its rapidly changing nature. It is true that we now have statistics for something like fifteen postwar years; but for the industrial countries outside of North America this period is not homogeneous in the characteristic of greatest importance in our present context: the determination of imports. It is only in the last few years that these countries generally have convertible currencies, a minimum reliance on import restrictions, virtually no discrimination in their imports, and adequate reserves. While these changes in behavior do not necessarily present insurmountable obstacles to the statistician, they call for great caution in the interpretation of the results.

The first two groups of countries have many characteristics in common.[2] They are similar in size with gross national products in 1960 of about 540 billion and 340 billion dollars, respectively, as well as in behavior. The estimates of their short-run marginal propensities to consume out of real GNP are both equal to about one-third. Both areas have strong built-in stabilizers which would give them small "international reflection ratios"; that is, changes in imports induced by unit changes in exports. They have sufficiently large reserves to ride out changes in their exports; in other words, they do not normally have to upset the functioning of their built-in stabilizers by sudden governmental policies to rescue the balance of payments. This is not to say that some of these countries did not occasionally have to take emergency balance-of-payments action; but such action had to be taken to correct troubles of domestic, not of foreign, origin.

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[1] J. J. Polak, *An International Economic System* (Univ. of Chicago Press, 1953), p. 14.

[2] This is not the place to describe the entire model in detail. Its main features should, however, be briefly indicated. For each of the two industrial regions there is a consumption function and two equations explaining commodity imports from each of the two other regions, as well as several equations determining the payments for services, two functions explaining domestic and export prices, and a GNP identity. Investment and government expenditures are autonomous. For the primary-producing region we have a balance-of-payments identity, an export price equation, and a number of equations which explain how total external payments are distributed among goods imports from the two

For our world model we require estimates of the marginal propensities to import of each region. In making these estimates we have made allowance for the fact that import fluctuations, especially in Europe, are closely related to inventory changes, by using deviations of GNP from trend plus a separate trend term in the import functions. The resulting marginal propensities to import reflect the cyclical rather than the longer run dependence of imports on income. North American imports tend to rise by about 5 per cent of an increase in GNP relative to its trend value, compared to an average propensity to import of about 3 per cent. By contrast, the imports into Western Europe and Japan are found to rise by about 22 per cent of an increase in GNP relative to the trend, compared to an average propensity to import of about 10 per cent. For both areas the induced increases in imports are about equally distributed between goods and services coming from the other industrial region and those bought from the primary producers. As we have seen in the preceding paper, the fluctuations in income and output in postwar Western Europe were so minute that these estimates of a cyclical marginal propensity to import must be interpreted with caution. Nevertheless, these figures fit the past data quite well. They help explain, for instance, why North American imports have fluctuated much less than European imports, despite the fact that European business conditions have fluctuated much less than those prevailing in North America. They also provide a partial explanation of the fact that the U.S. trade balance deteriorated during the 1958 recession although the European decline was far milder than the American contraction.

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industrial regions and payments for services. These equations determine income, consumption, and domestic prices in the two industrial regions, and the imports of goods, the export prices, and the payments for most services, in all three regions. The coefficients of these equations have been estimated from annual data 1948-60, generally in terms of first differences, by classical least-squares regression. With the exception of one of the price elasticities, all coefficients mentioned in this paper are significantly different from zero at the 95 per cent level of confidence. A full report on the model will be made available in the near future by the Research Department of the International Monetary Fund.

With respect to price elasticities of demand the two industrial regions are found to be quite similar. For instance, their short-run price elasticities of demand for one another's commodities are estimated to be between −1 and −2, and their elasticities of demand for the products of third countries seem to lie around −0.5.

The third area is quite different in its economic behavior. Most of the countries in this area do not have strong built-in stabilizers. Quite apart from this, however, almost none of these countries has adequate reserves to be able to afford such stabilizers even if they could be fitted into its social and economic structure. The postwar history of this group has been—after some of the high reserves left over from the war had been used up—that the aggregate reserves of these countries have remained roughly stable at a level of around 12 billion dollars over the last decade. As a group these countries have had to adjust their foreign exchange outgo, mostly for imports, to their foreign exchange receipts on account of exports, inflow of private capital, and aid. Individual countries have been able at times to delay the reduction of their imports in response to a decline in exports by drawing on their reserves or on credits; but at the same time other countries have had to reconstitute their reserves or to repay credits even at a time when their exports were declining. Broadly speaking, therefore, it is not an inaccurate description of the behavior of these countries as a group to say that they have had to adjust their imports to their exports; i.e., that they should be considered to have an international reflection ratio of the order of magnitude of unity.

Mention must still be made of the role of price fluctuations in the international model. In this connection, particular attention has to be paid to the prices of primary products, which have shown large fluctuations in response both to industrial demand and to supply conditions. Since the demand for primary commodities in the industrial areas is fairly inelastic, the export value of the less developed countries, and thus their imports, will generally fluctuate more than the volume of their exports in response to changes in world demand. This indirect influence of demand variations in the industrial countries, via changes in primary product prices, on their own exports to the less developed areas is only to a small extent offset by changes in domestic expenditures due to the real income effect of these price changes, since the short-run marginal propensity to spend in the industrial countries is quite low. In other words, a decline in primary product prices amounts to a redistribution of purchasing power from high marginal spenders to high marginal savers and, therefore, to a net decline in world aggregate demand.

Leaving out refinements, the description of the transmission mechanism implied in the model may be summarized by referring to some of the key multipliers of the system. Assuming consumption and imports of the industrial areas to be the only variables directly dependent on GNP, changes in domestic investment and government expenditures on goods and services in North America affect the GNP of this region by a multiple of about 1.4, and the GNP of Western Europe and Japan by one of less than 0.1. On the other hand, the internal multiplier of Europe and Japan is smaller, perhaps 1.2, because of this region's larger marginal propensities to import, and for the same reason the multiplier effect of variations in autonomous expenditures in this region on North America's GNP is considerably larger, around 0.3, than the corresponding effect in the opposite direction. That is to say, a fall in North American investment by 10 billion dollars would reduce the GNP of the other industrial countries by less than 1 billion, while a similar decline of investment in Europe and Japan would reduce North America's GNP by 3 billion. This last effect would, of course, still be very small in relation to the size of North America's GNP. A substantial decline in European economic activity would, therefore, be a matter of concern to North America for its balance-of-payments effect rather than for its impact on income and employment.

The substantial damping in the mechanism by which fluctuations in economic activity are transmitted between the two industrial regions is fully in accordance with the observations made during the last decade about the virtual independence of cyclical developments in Europe and in the United States. The mild movements in economic activity in either one of these areas—and it is important to stress that the autonomous movements since the war have always been mild—transmitted by a heavily damped mechanism, produced very little effect in the other area. As far as the primary-producing countries are concerned, their main difficulty during the decade would seem to have been attributable to changes on the supply side in conjunction with low price elasticities of demand rather than to demand fluctuations.

Stabilization Measures. The preceding discussion would seem to indicate that there is little scope for bringing greater stability to the world economy as a whole by increasing even further the shock absorbing nature of the transmission mechanism. Whatever can be done in this respect concerns chiefly the primary-producing countries. In this connection one could think in the first place of measures to stabilize the exchange receipts of these countries, and thus their imports, by stabilizing prices and production of primary commodities—a subject that can only be mentioned here.

Slightly more should be said of measures of the general character of providing for the primary-producing countries access to supplementary international resources that would permit them to stabilize their import level in the face of fluctuations in their foreign exchange receipts.

Because of the well-known tendency of the less developed countries to use up their own reserves under the pressures of internal demand, these supplementary resources would preferably have to be made available on a loan basis, to be drawn upon in periods of difficulty and to be repaid subsequently in periods, if not of ease, at least of less extreme difficulty. Resources for these purposes are available to countries through their membership in the Fund. Quite a number of countries have used the Fund for just this purpose by drawing on it to provide compensatory financing in cases of export declines. It has recently been suggested, both in a report by a group of UN experts and at the Punta del Este meeting of the countries of the Western Hemisphere, that additional funds be lined up internationally, on a partly contributory basis, to compensate export fluctuations of primary-producing countries on a more automatic basis.

It is, of course, difficult to estimate the stabilizing effect of measures of the types just discussed, since the extent to which they would lower the reflection ratio of the underdeveloped region would depend, among other things, on the manner in which the compensatory funds are made available. In the limiting case in which the imports of the primary producers would remain constant in the face of fluctuations in the demand for their exports, the internal multipliers in the two industrial regions would be very slightly reduced, but the cross-effects of expenditure variations in one of the industrial areas on the other, that is, the transmission effects, would be reduced by about one-half. In reality the stabilizing effect would probably be smaller. The reflection ratio of the underdeveloped region is, of course, not precisely unity at present, nor is it likely to fall to zero as a result of any program of compensatory financing of fluctuations in export receipts. On the other hand, we have not taken account of the influence of demand fluctuations in the industrial countries on primary product prices. Had we done so, the original multipliers would have been larger and the reduction in the size of these multipliers due to the stabilization of the imports of primary producers would also have been larger.

The limiting case in which the imports of the primary producers do not change at all may be used to compute the order of magnitude of the resources necessary to carry out a program of full compensatory financing. If a recession were to reduce the GNP of each of the two industrial areas by 5 per cent, or by 25 billion dollars in North America and by 15 billion in Europe and Japan, the compensatory financing necessary to offset the induced balance-of-payments deficit of the primary producers, apart from the effect of a likely fall in their export prices and a very probable reduction in their receipts of private foreign capital, would be of the order of magnitude of 2.5 to 3 billion dollars. What proportion of such an amount would be actually used, if available on a short-term credit basis, would depend on the attitude of the primary producers toward such a program.

II. *Autonomous Fluctuations in Aggregate Demand*

During the postwar period the fluctuations in aggregate demand in the industrial countries have been very mild. The model which has been used as the background for this paper is, in fact, one which applies chiefly to such mild fluctuations. There can be little doubt that in the case of a sustained decline in income of the sort experienced during the early thirties the marginal propensity to consume would tend to increase and induced changes in investment would also take place. While we have estimated certain constant coefficients from the postwar data, we must expect to encounter a number of important nonlinearities outside the range of economic fluctuations actually observed during this period. Some of these nonlinearities are related to cumulative effects on the levels of certain stocks. Just as the exhaustion of the stock of past personal savings during a period of progressive decline in income will lead to an increase in the marginal propensity to consume, so will the exhaustion of foreign exchange reserves during a period of persistent balance-of-payments deficits lead to government policies which adjust imports more quickly to a falling level of exports and which thus amount to an increase in the international reflection ratio. It is not necessary to describe in detail how this principle applies to the cases of unemployment insurance and welfare funds, corporate savings, and other exhaustible stocks whose variation normally provides part of the built-in stabilization which we have found implicit in the low estimates of the marginal consumption-GNP ratios.

As a result of these considerations, a system describing a world economy subject to severe autonomous shocks would also be inherently more unstable in its response mechanism. The avoidance of such severe shocks is chiefly a matter of the pursuit of the proper national policies in the industrial countries, under which heading we should also admit a large and growing role for the influence on national policies of direct consultations among countries and of international agencies acting in the pursuit of their assigned functions. It is national action that attacks the problem of world-wide fluctuations at its root: in the generation of the level of over-all demand. National policies ought to see to it that this demand is neither excessive nor insufficient.

Among the policies determining aggregate demand in the industrial countries are those relating to foreign investment in the less developed countries and to foreign aid. Since it is assumed that primary producers spend their entire foreign exchange receipts on imports, variations in private foreign investment in these countries and in foreign aid grants and loans to their governments have an indirect employment effect in the industrial regions. The size of this effect reflects the over-all multiplier of the system, which gives the ratio of the change in real income in the two industrial areas combined to the originating change in autonomous expenditure, wherever it may have occurred, as about 1.5. Ignoring price effects, output in the industrial countries will thus tend to rise by 1.5 times an increase in foreign aid or in other capital receipts by the underdeveloped countries, and (disregarding the possible distributional effects of the "tying" of aid) this increase will be equally distributed between North America and the other industrial countries. Stability of the annual outlays under these programs is, of course, desirable for a number of reasons other than that of employment stability in the industrial regions.

Action by individual countries to maintain a stable level of aggregate demand can be supported by proper management of international liquidity. There has been a great deal of discussion on this topic in recent years, particularly on the extent to which a lack of international liquidity would cause world deflation or a reversal of the movement towards freer trade and exchange policies, and the extent to which an excess of liquidity would produce world inflation. These important questions cannot be dealt with further in this context. It would, however, be a mistake to look to the management of international liquidity as the cure for cyclical instability of the world economy. The primary responsibility for keeping the world economy on an even keel inevitably rests with the main industrial countries. The regulation of international liquidity could help only to a limited extent to stave off the consequences of any failure on the part of these countries to perform this task.

III. *International Movements of Short-term Capital*

One of the important characteristics of the model that has been described is the assumption that the industrial countries have adequate reserves to let their built-in stabilizers do their shock absorbing work. This assumption seems to be quite reasonable as far as fluctuations in the exports of the industrial countries are concerned. It is not, however, fully justified without qualification with respect to changes in reserves that may arise as a result of large movements of short-term capital. These movements have become far more important in the last few years as a result of the restoration of convertibility. These new developments have brought with them a potential threat to international economic stability, arising this time from the capital account rather than from the trade account of the balance of payments, and new policy approaches are emerging to meet this threat. The problem is that the effect of capital outflows on foreign exchange reserves may at times preclude desirable domestic expansionary measures, while capital inflows may sometimes make it more difficult to contain inflationary pressures.

Insofar as the movements of capital are attributable to differences in interest rates, one approach to the problem lies in the co-ordination of interest rate policies. This is without doubt a most important field for the further extension of international co-operation. Before much advance in this field can be expected, it will be necessary, however, to clarify what is meant by "co-ordination" of interest rate policies. On the one hand, the aim of such policies could be to ensure that national interest rates are sufficiently different so as to reflect adequately the different cyclical positions among countries; on the other hand, the objective could be to make interest rates in different countries sufficiently alike so as to minimize the international movements of short-term capital. It would appear that in the long run the closer integration of the industrial countries will tend to lead to a similarity in interest rates—somewhat on the pattern, if perhaps not to the extent, of the development in the United States over the last fifty years. This may entail that monetary policy in the industrial countries would have to be more uniform than it has been in the past. To the extent that individual countries find themselves in different phases of the business cycle, their stabilization policies would have to rely to a larger extent on fiscal and other nonmonetary measures, while the objective of a co-ordinated monetary policy would be to assist in the attainment of the appropriate international average levels of employment and prices.

Interest rate differentials are, of course, not the only determinants of capital movements. Whatever is done, therefore, in the field of interest rate policy, it is clear that adequate reserves must be available to deal with international movements of capital among the industrial countries. The provision of these financial resources is the cornerstone of the policies to ensure international financial stability. This problem was brought into international discussion about a year ago in terms of strengthening the resources of the International Monetary Fund. As a result of the discussions that took place before and at the last Annual Meeting of the Fund in Vienna, attention has been focused more specifically, not on an increase in the general resources of the Fund, but on lining up supplementary resources that could be used in special situations to forestall, or to cope with, an impairment of the international monetary system as such. The importance of this change in focus is that both the International Monetary Fund and the main industrial countries that are expected to make credit arrangements with the Fund for the lending of their currencies have undertaken the responsibility to see to it that the international economy is not endangered by a collapse of the international monetary system.

DISCUSSION

Walter S. Salant: We have had the benefit of two solid and thoughtful papers. In the ten minutes assigned to me I could not hope to discuss both of them. Therefore, I shall confine my discussion to Milton Gilbert's paper, referring to the paper by Messrs. Polak and Rhomberg only to the extent that it touches on the Gilbert paper. Because this paper is well written and easy to read, it may appear to be digestible at one reading. The appearance is deceiving. It contains or implies a great deal more than can be fully absorbed at the first reading and presents conclusions that must reflect a good deal of hard thinking about the events which Mr. Gilbert knows at first hand over the entire period since the war. The repeated reading of this paper is especially needed because some of the most interesting conclusions are only implied.

As I see it, the main points in the analysis of the European experience are these:

1. Europe has had only two recessions since the war, one in 1952 and one in 1958, contrasted with the four that the United States has had.
2. The 1952 recession was due mainly to restraints exercised by the policy-making authorities for the purpose of correcting balance-of-payments difficulties; although the reaction from the Korean boom was also a factor, it was secondary. The 1958 recession was also due to policy restraints exerted during the three years 1955 to 1957. These restraints were applied mainly to correct excess demand, overfull employment, and inflationary pressures, although balance-of-payments difficulties were a factor in some or most cases. Thus the only recessions resulted from policy measures, taken deliberately.
3. The recessions also were ended by policy management. Restraints were relaxed "when the authorities considered that expansion could be safely resumed." And it did resume.
4. Even these two recessions cannot be properly regarded as contraction phases of business cycles. The reason is not that Mr. Gilbert is reluctant to call a pause in expansion, even a horizontal movement away from a rising trend, a recession, but because the recessions, including the horizontal movements, were policy-induced rather than the results of distortions generated by the preceding expansionary movements. Policy anticipated the development of distortions and thereby prevented them from becoming serious.
5. There is a suggestion of a conclusion here that if policy would always anticipate these distortions, recessions would always be mild and that relaxation of restraints can always be counted upon to start a new expansionary movement.

Except for this last point, which may be only an incorrect inference on my part and not intended by Mr. Gilbert, there is nothing in this analysis with which I feel an impulse to disagree, or indeed about which I have enough knowledge to be entitled to disagree, even if I had the impulse to do so.

Nevertheless, I should like to place greater emphasis on one point that Mr. Gilbert mentions only in fairly low key. This point is that, throughout the postwar period, the long-run forces making for economic expansion were strong in Europe. I suspect that this fact may lead to a different slant on policy and that it makes a number of the conclusions look a bit different.

For example, perhaps the recessions were mild not because "timely action"—the word "timely" is Mr. Gilbert's—anticipated distortions and prevented them from developing but because the long-run growth forces were strong. Indeed, maybe it was the strength of these forces that prevented things from looking like distortions that would have looked like them under less favorable underlying conditons. What is a "distortion," anyway? Structural changes certainly occurred. They can lead to recessions, as Mr. Gilbert points out near the end of his paper. I should say they are a distortion, unless we wish to play the now obsolete (I hope) game of defining the problem away by calling something a distortion only when it leads to recession.

Similarly, is it not possible that in the absence of strong growth forces the mere relaxation of restraints would not have sufficed to permit expansion to resume? The authorities may have relaxed, as Mr. Gilbert says, when they thought expansion could safely resume, but I suspect those forces were required to validate their assumption that it *would* resume. We need only recall that there have been occasions, in a past not so distant as to be dim to me, when mere relaxation of restraint—in fact even policies of pronounced ease—did not suffice to produce expansion. Presumably the reason was that there was too little pressure in the economic boiler.

With regard to anticyclical policy, then, my different emphasis suggests the following conclusions:

First, policies of mild restraint, if followed in the absence of strong growth forces, may indeed cause severe recessions. It is premature to make a generalization that the stabilization authorities can prevent pauses or dips from becoming cumulative merely by easing up on restraints, even though it may have been true in the period Mr. Gilbert has analyzed. The difference between prewar and postwar experience is *not* just that the stabilization authorities in Europe are smarter now, although undoubtedly they are. The environment in which they have been working has been more congenial to their objectives.

Second, I am not so confident that there really is—or always is—as much "room for trial and error in policy measures" as Mr. Gilbert says or that there is "so much time for taking remedial measures without alarmingly adverse effects." I do not know whether Mr. Gilbert meant his statements on this score to apply more generally than to Europe in the past fifteen years but I would hesitate to apply them generally.

Third, Mr. Gilbert sees the possibility that in the years ahead recessions in Europe may be more serious than in the recent postwar years because of structural changes—substantial shifts in the pattern of demand requiring substantial shifts in resource use. It is worth noting that even big shifts can be made with little general effect if there is a big head of steam in the economic boiler. I cite the enormous decline of war expenditures in the United States in 1945 to 1947 as an example. Mr. Gilbert notes the general point in low key when he says "the high degree of flexibility shown by the productive system, benefiting from a rapid rate of growth, has given reasonably smooth transitions." I should be inclined to say, "the rapid rate of growth has given reasonably smooth transitions." And without guidance from him I might have added only the modifying clause, "despite a *low* degree of flexibility." If my emphasis on the role of forces making for long-term growth is correct, the degree of optimism justified depends largely on the future strength of these forces. Mr. Gilbert labels as contrary to his own the view which emphasizes the long postwar reconstruction boom in Europe and forecasts greater difficulties now that this boom is ended. I include reconstruction as one force that has kept demand pressing on capacity, but long-term forces of expansion other than reconstruction may—probably were—also operating.

Although Mr. Gilbert apparently does not believe that the business cycle in Europe will be like that of the United States when the postwar reconstruction boom ends, he does warn that the contrast between European and American success in maintaining close to full use of resources is often exaggerated, that the contrast is mainly in the last five or six years, and that it is between the upward trend in Europe and the flat trend in the United States. Here, toward the end of his paper, he gives increasing attention to the fact I have stressed. He notes that under the conditions of a stimulative climate of demand, the volatile components of output have not been so volatile. His view of what caused this climate of demand is to me one of the most interesting, although less emphasized—I nearly said "best concealed"—points in the paper. He attributes it, too, mainly to policy rather than natural forces, when he says it is due "primarily to the continuing policy stimulus to demand in key sectors such as housing, public enterprise investment and private plant and equipment investment, with the objective of attaining high employment and growth."

At this point in the paper—and only on the second reading—I detect what appears to me some shift in direction. The superiority of the European performance in avoiding recessions is still due to policy, but the big difference is not so much in anticyclical policy, narrowly defined, as in longer run policy. If so, let us praise policy, but not mainly anticyclical policy in the usual and narrow sense. The European countries have kept a good head of steam in the boiler at all times, whereas we in the United States have not. If I am right in thinking that this is Mr. Gilbert's diplomatically stated message, or became so as he approached the end of the paper, I agree. Then the difference in the month-to-month actions of the stabilization authorities become less important in his explanation of the differences in results and the emphasis is put where I suggest it probably belongs—on the long-run policies that put the steam in the boiler and gave anticyclical policy the freedom of action it had.

I would like to note one score on which the difference between the European and American environment of the past few years may diminish in the future. It relates to the balance-of-payments restraint on the stabilization authorities. It is probably true, as Mr. Gilbert says, that the United States must expect a basic deficit at full use of resources. But I call to attention the fact that wholesale industrial prices (the components of the BLS index other than farm and food products) have not risen at all since early 1958, a period close to four years. I have the impression that, during this time, European industrial prices have risen slightly. It is true that the available indices are not weighted in the way most relevant to exports, but the prolonged recent stability in the United States is worth noting, if only because it is so rarely mentioned. If it continues and if expansion continues in Europe, the relative price movements will work toward reducing the restraints on the United States more quickly than many people expect, despite the rise in GNP and perhaps toward increasing those on Europe. Another aspect of the balance-of-payments restraint is one that Messrs. Polak and Rhomberg have referred to in their paper. Europe's postwar success in domestic stabilization may have resulted in part from the breakdown of international private capital flows and the greater autonomy of national policy that it made possible. If the return to convertibility means a revival of these capital flows, there is another reason why Europe's success in stabilization may be less in the future.

These points raise the general question of whether the old idea that stabilization authorities have to steer a very narrow course between causing a severe recession and permitting a suicidal boom is obsolete. Has the narrow course become a broad one? The idea that it is always a narrow course was simply one example of a serious failing of our profession—a tendency to make generalizations that are too general for the experience on which they are based. (As to other examples, I might say, as the lady with the compulsive love of potato pancakes said to her psychoanalyst, that I have bureau drawers full of them.) Let us not add another example by concluding that there is always much room for trial and error. Sometimes there is and sometimes there is not. We need to distinguish between the effects of putting on the brakes when the engine is working well and there is much gas in the tank, on the one hand, and on the other, of putting the brakes on when the engine is missing. New automobiles now carry warnings telling the driver not to step on the gas and the brake at the same time. The best cycle policy is to defy such warnings. The objective is not to bring the economic automobile to a halt but to be sure that when the brake is applied the car only slows down without stopping, and that when the brake is released the car will accelerate.

RICHARD E. CAVES: Both papers before us cautiously affirm the absence today of the business cycle and its international transmission as we knew it before World War II. However, the problems of macroeconomic policy hardly diminish thereby, and we seem to face a new series of dilemmas in achieving our goals with regard to economic development and international monetary policy.

Polak and Rhomberg offer us the results of what is clearly an ambitious model of the international economy since World War II. They have not withdrawn their rabbit from beneath the rug for close inspection, but if we accept their description, it shows some strikingly familiar behavior. Short-term income fluctuations—or rather, deviations—in the industrial countries control the volume of exports and the terms of trade of the primary-producing countries. The latter have a "reflection ratio" of nearly unity; so the exports of the industrial countries are thereby explained as well. In general outline, these conclusions exactly match those revealed in the study of the international economy before World War II by Neisser and Modigliani, Polak himself, and W. Arthur Lewis. One wonders how these results compare in detail, parameter for parameter, and what implications lie in the differences.

One can only echo Polak's hope for the development of more national economic models which can be linked into a model of the international economy. There are many other ways, however, in which the foundations of such a model can be improved. One would be through some specialized statistical work to track down the full economic consequences of foreign aid and foreign investment moving between various areas. Another would be some close attention to the sensitivity of industrial economies to each other's fluctuations along the lines explored by Gideon Rosenbluth's work on Canadian-American business cycles. Can North America cast off her title of mother of business cycles, once so firmly bestowed, or do Mr. Gilbert's propositions imply its reassertion? What are the implications for international stability of the movement toward economic integration in Europe, with the attendant prospect of more highly correlated income disturbances for the member economies?

Polak and Rhomberg give proper caution about the degree to which their estimates relate to short-term changes, for indeed their parameters might extrapolate poorly to longer periods. One example is the low domestic multipliers and the implied low marginal propensities to consume. These might not hold in the face of a greater fluctuation of autonomous spending in one industrial region, or a coincidence of disturbances in the two industrial areas. The relatively high marginal propensity of Western Europe to import from North America may well reflect the influence of excess capacity and "marginal supplier" phenomena.

The numerical results of a model of this type contain major potential implications for policy. The price elasticities of demand of the industrial regions for each other's goods are relatively high. They support a growing volume of evidence that the trade balances of industrial countries are quite sensitive to shifts in the relation of their domestic price levels, and potentially to exchange rate variations as well. On the other hand, the low elasticities of demand for the exports of third countries speak ill for price-based adjustments of the trade balance between industrial and primary-producing countries. The numerical values of the multipliers also have some interesting implications. North America would raise its employment level more by an extra dollar of foreign aid, provided Europe matched the increase, than by an extra dollar of public investment at home.

An important policy thread of Polak and Rhomberg's paper is the case for commodity price stabilization and its relation to other policy goals. Fluctuations of the prices of primary products actually increase the stability of real incomes in the industrial areas; yet the stabilizing force comes in the relatively unappetizing form of improving terms of trade at times when aggregate demand is weak. Thus the objectives of stabilizing employment and stabilizing real income in the industrial countries are in limited competition, and successful measures to reduce commodity price fluctuations would stabilize both the real incomes of primary producers and aggregate demand for the industrial countries. However, the mechanism for the international transmission of cycles now seems to be highly damped; so the problem of commodity stabilization does not embody quite the narrow self-interest for industrial areas which it might have held in the thirties.

A common problem of policy—that of international monetary arrangements—lurks behind both Gilbert's discussion of the success of domestic income stabilization in the industrial countries and Polak and Rhomberg's views on international stabilization. One indeed must wonder if the wit of Western policy formation on this matter will be quick enough to prevent mankind from being crucified on a cross of gold. The restoration of convertibility for the major European currencies has abruptly wrested away the short-term interest rate as a tool for domestic stabilization, and no amount of talk about international co-operation on monetary policy and the use of alternate monetary gadgets will repair the damage. The truth is, that when the short-term interest rate becomes a policy variable, international short-term capital movements lose nearly all significance for allocating scarce resources among nations; yet this is an empty truth, for the folly of preventing them directly is well known. The International Monetary Fund is oriented toward dealing with short-term imbalance in rates of national economic expansion and not toward correcting over-all inappropriate policies which seek to maintain a shaky and illogical gold exchange standard. Yet it is to just such policies that major nations are forced by the illogic of the system, and the current position of the United States and the unsatisfactory Vienna agreement constitute but one sample from a large universe of unpleasant possibilities. Just as the return to convertibility has taken a major monetary tool from the kit of domestic stabilization measures, the central banking fraternity, oriented toward preserving its asset values, is purloining the tool of fiscal policy by imposing the requirement of a balanced budget as a test of financial morality and a ransom for maintaining the gold exchange standard. In the loss of the tools to deal with the business cycle before it can be finally declared dead—there lies the rub.

EMILE DESPRES: The papers of Mr. Gilbert and of Messrs. Polak and Rhomberg have provided further confirmation that short-term cyclical fluctuations—and their international propagation through the automatic operation of the foreign trade multiplier—are no longer problems of major importance for the industrially advanced countries. It is important to recognize, however, that we are by no means free of critical problems in this field.

The nature of the problem has changed. The chief present problem arises neither from short-term cyclical fluctuations nor from severe inflationary or deflationary developments in particular countries. It arises, rather, from rapid structural changes in the world economy within an international monetary and financial framework which is inadequate to accommodate the balance-of-payments consequences of these changes. This creates a serious danger of secular retardation of growth in countries suffering external deficits and its gradual propagation to other countries as well. Indeed, this process of secular retardation seems to have already begun.

The largest source of structural disturbance is the inevitable unevenness of improvements in productivity—unevenness from period to period, from industry to industry, and from country to country. Major structural changes are taking place today within a framework characterized by currency convertibility, relatively liberal commercial policies, and greatly constrained cyclical fluctuations. Within this framework, uneven rates of improvement in productivity tend to produce large shifts in trading patterns and large, prolonged swings in net current account balances which it would be undesirable to suppress. These swings are not short-term oscillations which cancel out in a few years; large imbalances in one direction or another should be expected to persist for a number of years. Although liberalized trading conditions widen the scope for eventual adaptation and adjustment of imbalances, this should not obscure the fact that, in the first instance, they allow such imbalances to become large and to persist for prolonged periods. Under the earlier regime of direct controls and inconvertibility, these imbalances could be quickly suppressed. Moreover, under our present system of quasi-fixed gold parities capital movements among the industrially advanced countries are more likely to reinforce than to neutralize the imbalances in current accounts.

Under today's conditions it is fatuous to expect balance-of-payments equilibrium, as conventionally defined, to be closely approximated from year to year or even over a period of several years. But the existing international monetary framework does not provide adequate facilities for financing the large and prolonged imbalances which, under liberalized trading conditions, are the reflection of a dynamic international economy.

Our international monetary institutions simply do not fit our newly liberalized trading and payments arrangements. This creates a striking lack of symmetry between the reaction of deficit countries and that of surplus countries. As their reserves become deficient, deficit countries find themselves under increasingly urgent pressure to correct their deficits; the pressure on surplus countries to halt the accumulation of redundant reserves, either by increasing their domestic effective demand or by providing the external finance which would permit continued surpluses in their international accounts, is not so urgently felt. This asymmetry introduces a pervasive deflationary bias into the world economy, which first impinges on the deficit countries and then is transmitted by them to the surplus countries both directly and through underdeveloped countries as intermediaries.

The most likely consequence, unless adequate financial mechanisms are created, is international propagation of secular retardation; i.e., sluggish growth. There is no likelihood today that any country would accept sharp, cumulative deflation, deep depression, and massive unemployment as a means of eliminating a deficit in its international accounts. On the other hand, monetary and fiscal policies in the United States, in Britain, and perhaps also in Japan are being based today on a delicate and uneasy compromise between domestic growth objectives and balance-of-payments considerations. The difference over five or ten years between a close approach to full employment and an average level of unemployment of 5 to 7 per cent is much greater than the simpler calculations on this subject reveal. The difference between full employment and moderate unemployment is not chiefly that output is raised by increasing labor input, nor is it primarily that aggregate investment is higher when employment is full. The chief difference is that the climate of buoyant demand and active use of productive resources which full employment entails is one in which innovations and improvements come forward rapidly and resources gain mobility, moving readily from obsolete fields into newer fields of growing competitive strength. This is the main difference between full employment and "high-level stagnation"—5 to 7 per cent unemployment. Fundamental correction of underlying deficits in external payments of structural origin requires an acceleration of innovations, more rapid improvements in technology, and the transfer of resources to new industrial fields. But as Britain's experience since World War I has demonstrated, these conditions could not be realized when aggregate demand was constrained by policies which almost continually reflected a preoccupation with the balance of payments. The uneasy compromise between domestic economic objectives and the so-called "discipline" of the balance of payments serves to hamper economic growth and needed structural change, and thus to perpetuate the imbalance in external payments. When the source of payments imbalances is structural, a substantial increase in deficits in the short and intermediate run is likely to be indispensable for constructive long-run adjustment. The Marshall Plan, even after allowance for the special circumstances, was a vividly dramatic illustration of this principle. Until conditions are gradually created under which international capital movements on private account can perform an equalizing role, payments imbalances among advanced countries will require official compensatory financing on a much larger scale and for longer periods than has hitherto been customary.

It is wrong to think that such financing merely postpones necessary adjustments. On the contrary, it makes possible the structural changes and adaptations in both deficit and surplus countries necessary for removing the causes of unbalanced international payments, without handicapping growth. It would be ironical indeed if the advanced industrial countries, having proclaimed through OECD ambitious growth targets for the sixties, did not adopt the basically simple international financial measures without which these growth targets will have little chance of being realized.

SOVIET ECONOMIC PLANNING

INPUT-OUTPUT ANALYSIS AND SOVIET PLANNING*

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One of the consequences of Premier Khrushchev's virulent attack on Stalin and Stalinism, at the Twentieth Communist Party Congress in 1956, was the removal of the stamp of heresy from Soviet discussions of a number of contemporary techniques of economic analysis. Among these was the use of modern mathematical methods in economics. In the past five years there has been a surge of interest in these methods and their possible application to Soviet planning. Research organizations have been founded, computing centers set up, experiments conducted, conferences held, and articles and books published.

In this paper we will discuss one of these mathematical methods, input-output, and its possible application in one particular aspect of Soviet planning; the construction of the short-term, annual economic plan.[1] Furthermore, we will restrict our discussion to one particular aspect of the process of plan construction: that part concerned with the attaining of internal consistency in the annual plan. We enter the planning process after a set of preliminary production targets has already been established by the Soviet political leaders. We do not inquire into the rationality of these targets, but just into their internal balance; i.e., the assurance, for example, that if the output of a certain number of tons of steel is planned, then the necessary outputs of coal, pig iron, and of all the other input materials into steel are also planned. Of course, as the internal balance of the plan is worked out, the set of initial production targets is altered. But the general configuration of these targets is not significantly changed, and thus a basic part of the question of resource allocation remains out of our scope. In sum, we are concerned primarily with the intermediary flows rather than with the final flows.

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[1] It is the annual plan which, of all Soviet plans, is the operational one—operational in the sense that its figures embody direct commands to producing units or are control totals upon which direct commands are constructed.

To the economist brought up in the world of the market economy, this may appear to be an exceedingly uninteresting problem. For Western economic theory has, for the most part, ignored the problem of intermediary flows and has concentrated on the flows of final products and primary factors. This is understandable, because in Western theory the important events are taking place in the final goods and primary factor sectors and the price mechanism is seen to convey the decisions made there to the intermediate sector in an automatic way. But in a centralized nonmarket system the transference of decisions from the final sector to the intermediate is not automatic. In the absence of an actively functioning price and profit system, the flows of intermediate materials from producing firms to consuming firms must be consciously controlled by the economic planners. Therefore, in a nonmarket economy the problem of intermediate flows takes on an importance which it does not have in a market economy. This is demonstrated by Soviet experience. Soviet planners have been much concerned with this problem, for it has been the cause of great difficulties to them.

We will first briefly analyze the present methods used by Soviet planners to achieve the internal consistency of annual plan. Then we will discuss the role that input-output techniques could possibly play in this process.

I

The process of annual plan construction can for analytical purposes be divided into a series of stages. It should be noted, however, that in practice the stages are not sequentially distinct. Moreover, there have been repeated modifications and experimentations since the time of the reorganization of industrial administration in 1957 and especially since 1959. Therefore, what follows is essentially a generalized view of the process of plan construction.

Roughly speaking, the process of plan construction consists of the flow and counterflow of instructions and information. The first stage is concerned with the gathering and analysis of statistical information on the base period. In order to construct a plan, especially one which embodies immediate operational instructions to economic units, the planners must have as precise a picture as possible of the economy during the "planning year" (the year preceding the "planned year"—the year for which the plan is constructed)—where it has been and where it will be at the beginning of the planned year. This statistical picture, put together during the first half of the planning year, is supposed to reveal the accomplishments and defects of the economy, to depict the state of available productive resources and their distribution, and to indicate those areas—the bottlenecks—which need the most attention during the forthcoming year. In addition, the statistical investigation is supposed to uncover hidden or new reserves for the further improvement of the economy.

The second stage is the one wherein the major objectives of the political leaders for the planned year are communicated to the producing units. The political leaders inform the planning board (Gosplan) of the priority tasks they have set for the economy for the planned year. On this basis, Gosplan constructs a set of preliminary aggregate targets, usually called control figures, which they send down through the planning hierarchy to the basic enterprises and which act as guideposts to the lower units in the construction of the plan. In drawing up the control figures, the planners try to balance the output targets of the aggregate product groups included and their estimates of the economy's demand for these products, so that the control figures comprise not just a set of priorities but a consistent set of priorities.

In the third stage, the plan comes up the planning hierarchy from the enterprise to Gosplan. Having received the information from the control figures relevant to it, the enterprise has a fair idea of what its output targets in the planned year will be. It now proceeds to construct a list of input materials it will require. For this purpose, it has to know not only its output targets but also how much of each input it will need per unit of output. This information is supplied by a series of materials input norms which are established for the firm at various levels of the planning hierarchy (and a few of which it establishes itself). To get the quantity of input materials required, the firm then multiplies its planned output targets by the appropriate input norms.

One of the important operating characteristics of the Soviet economy is the constant pressure applied from above to reduce these input norms, to be continually on the lookout for ways of economizing on the use of input materials. Running counter to this, there is an attempt on the part of the lower units to pad input norms and thus make plan fulfillment easier to accomplish. This conflict is clearly seen as the plan comes up the planning hierarchy. In what is essentially a bargaining process, superior organs try to cut away the excess fat in the plan and subordinate organs try to protect the safety margins they have been able to place there. The plan works its way up the planning hierarchy, being tightened and consolidated as it goes. Finally it reaches Gosplan.[3]

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[3] The planning hierarchy before the reorganization of 1957 was along ministerial (branch) lines: from (say) a steel enterprise to a main administration in the ferrous metals ministry and then to the ministry of ferrous metals and to Gosplan. The hierarchy is now: enterprise to a council administrating an economic region, to the planning committee of the republic, and then Gosplan. The bargaining process at all levels below Gosplan is muted by the "family relations" which existed within a ministry and now exist within a republic. Only at the Gosplan-ministry or Gosplan-republic level is true bargaining to be found.

It is then the task of Gosplan, in the fourth stage of plan construction to work out the internal balance of the state plan. The state plan is, of course, still at a fairly high level of aggregation; yet it is much more detailed than the previous control figures. As regards the problem at hand, Gosplan, in the period since the war, has had to balance the planned supplies to and demands of the economy for 800-1,600 separate product designations. These are the so-called "funded" or centrally allocated products. It normally has had about two months in which to accomplish this.

After working out a balanced draft of the plan, Gosplan sends it to the Council of Ministers for confirmation. This stage, stage five, is not just a formality. Because of reasons to be explained below, Gosplan's draft does not please everyone and there are many complaints about it to the Council of Ministers by people with political power. As a result, a number of changes are made in the plan by the Council of Ministers before it is confirmed.

In the final stage, stage six, of plan construction, the confirmed state plan is sent down the planning hierarchy to the basic enterprises. There it is put into detailed operational form and contractual sale and delivery arrangements are made between producing and consuming enterprises.

It is the balancing process in stage four which is of primary interest to us here. The question we ask is, how does Gosplan balance the supplies and demands for as large a number of materials as 800-1,600? The method Gosplan uses is termed the method of material balances. For each centrally allocated ("funded") product the relevant branch department of Gosplan constructs a balance sheet called a material balance. On one side of the material balance all the planned sources of supply of the particular product are listed and on the other side all the planned uses for the product.[3] The data used on the material balances at this stage come from the plans submitted by the various republics (formerly by the ministries). After all these data are in, each Gosplan office in charge of a material balance adds up the two sides of its balance. It is only by the wildest chance that the two will be equal at the first balancing. Normally they will be unequal and, according to Soviet sources, the inequality will usually be in the direction of a shortfall; i.e., the planned demands will exceed the planned supplies.[4] The problem then is to eradicate these imbalances.

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[3] A material balance thus is concerned with the distribution of a particular product and the balance between its supply and the demand for it, rather than being concerned with the production of the product and the balance between its output and the inputs into it. In input-output terminology, the material balance is related to a row of an input-output table rather than a column.

[4] For example, see *Ekonomika Promyshlennosti SSSR* (Moscow: Institut Ekonomiki, AN SSSR, 1956), pp. 80-81. This is what one would expect to result from the padding of norms and the general inflating of needs on the part of lower units.

Basically, two possible balancing approaches are open. One is an iterative approach. By an iterative approach we mean a solution process where an increase in the planned output of a deficit product is followed by increases in the planned outputs of all the inputs into this product, followed by increases in the outputs of all the inputs into the inputs, and so on—use being made all the time of a given set of input norms.[5] It can be shown mathematically that a sufficient number of such steps will yield an acceptably consistent set of material balances. However, as we have argued at some length elsewhere, we do not think that Gosplan has so far been capable of making primary use of an iterative approach. Rather we believe that substantial, although by no means exclusive, reliance is placed on balancing methods which avoid the necessity of making secondary changes. What this means essentially is that the producers of a deficit product are told to increase their output without their being given any additional inputs and the users of a deficit product are told they will get less of the deficit product but that they must produce just as much of their output as was planned before.[6] The priority principle operates here as well as elsewhere in the planning process. When possible it is the low priority users of the deficit commodity who have their allocations reduced the most.

This balancing method, then, adds to the pressure on input norms already applied in the general economizing drive. However, the pressure applied here is not consciously applied to cut away fat but is a by-product of the attempt to achieve internal balance in the plan. As a result of Gosplan's frequent inability to properly derive balances in the plan, the pressure on norms is often overapplied; not only is the fat cut away, but also some of the muscle. The balances thus obtained turn out to be mere paper balances, and the plan becomes unrealistic in that it is unattainable.

Another major deficiency of Soviet planning methodology is the excessive length of time it takes to construct a plan. Complaints are regularly heard about the completed annual plan not reaching the enterprise until well into the first quarter of the planned year.

II

The input-output method possesses a great advantage over the material balances method in that input-output puts the technical relationships existing among economic sectors into one unified scheme and allows them to be expressed mathematically in a fairly simple and very convenient form—convenient in that vast numbers of equations can easily be handled through the use of electronic computers.

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[5] Theoretically an iterative solution could operate the other way also. That is, the planned outputs of the products using a deficit product as an input could be reduced, followed by a reduction of all the outputs of products they are inputs into, etc. But the Russians reject all such approaches in which the economy is brought down to the bottleneck rather than the bottleneck up to the economy. See S. G. Strumilin, *Planirovanie SSSR* (Moscow, 1957), pp. 54-56.

[6] See H. S. Levine, "The Centralized Planning of Supply in Soviet Industry," in Joint Economic Committee, *Comparisons of the United States and Soviet Economies*, Part I (GPO, Washington, 1959), pp. 164-67.

How might Soviet planners apply the input-output approach to their balancing problems? In Western input-output usage, it is customary to start from a set of final demands (the Y vector), derived from either a forecast or a plan, to multiply this by a matrix of direct and indirect input coefficients (the inverted $[I\text{-}A]$ matrix) and thus solve for a set of total outputs (the X vector): $[I\text{-}A]^{-1}Y = X$.

Under present Soviet planning techniques, Soviet leaders, in the case of many products, effectuate their preferences directly on total outputs (the X vector). That is, the political authorities set targets which include not only the amount of a product going to final uses, but also the amount which is needed within the economy to produce other products. This approach of considering the total output of steel and the total output of electricity as objectives in themselves is perhaps related to the symbolic significance of these basic indexes as indicators of successful economic growth. But it is also related to the belief that the maintenance of a high rate of growth of these basic industrial commodities is a fairly logical and safe way of securing a high rate of over-all economic growth—the primary economic objective of the Soviet leaders.

The impression one gets is that Soviet planners are not thinking in terms of following Western input-output practice; they are not advocating the switch of politically determined targets from total outputs to final outputs. It seems clear that Soviet planners are thinking of using input-output in the construction of the annual plan to work "forward" from a given X vector rather than "backward" from a given Y vector. In this approach, input-output would be used to test the internal consistency of a plan (a set of planned total outputs) by merely using the equation: $[I\text{-}A]X = Y$, to check that no final outputs are negative. Any X vector which gives rise to a non-negative Y vector is thus a consistent plan.

In this way, input-output can be used to assure the internal consistency of the plan. Its use will also significantly speed up the balancing process because it will permit the use of electronic computers. The computer here will be employed to perform a simple matrix multiplication, the input-output approach serving as a language the computer can understand (something not accomplished by the material balances method). In many Soviet discussions of the possible use of input-output it almost seems that the use of the computer is the most important quality of the input-output method. The opportunity computers give of making a vast number of calculations in a short period of time is emphasized again and again. In light of the difficulty the Soviets have had in completing the plan on time, the importance of this point can be appreciated.

Moreover, the speeding up of the balancing process will enable Soviet planners to construct a number of (balanced) variants of the plan instead of the often poorly balanced, late, single variant now constructed. From these variants of the plan the Soviet leaders will be able to choose the one they prefer the most. (More on this in a moment.)

Use of input-output in this manner would not require the inversion of the [*I*-*A*] matrix. It is clear, however, that Soviet planners do intend to perform this inversion. They want to have a matrix of direct and indirect input coefficients so that at various stages of the planning process the total effect of a change in any one output target on all the output targets can be calculated. It is important for them to be able to calculate the total effect of any change, because as a result of the political bargaining nature of Soviet plan construction, changes in output targets are made quite frequently. This is true in stage four when the plan has come up to the Gosplan level and it is especially true in stage five when the plan is at the Council of Ministers where it is amended before being ratified. The possession of the full cost coefficients is also important during the actual operation of the plan, when, as so frequently happens, it is seen that for various reasons changes in certain output targets have to be made.

In addition to the preponderant view that input-output be used to plan from a set of total outputs, there are a few economists who advocate using the Western approach in planning from a set of final outputs. Also there is talk of a third possibility. This is a mixed model in which some targets for total outputs and some targets for final outputs are set *ex ante* and the remaining total outputs and final outputs are solved for from the resulting set of equations. Such a model has its advantages, for even when the political leaders are concerned with the total outputs of certain basic industrial goods, there are other goods in which their primary interest is final outputs (e.g., consumers' goods).

Input-output would give Soviet planners other advantages besides the assuring of the internal consistency of the plan and the speeding up of plan construction. After a balanced plan was calculated, the actual materials flows from one sector to another could be easily and rapidly calculated through the multiplication of direct input coefficients and the levels of output of the corresponding products. The spreading of technical progress could be aided by the use of planned direct input coefficients in the place of statistically derived ones and the feasibility of the planned set of input norms could be verified by checking whether the new $[I\text{-}A]$ matrix is nonsingular ($[I\text{-}A] \neq 0$). And, finally, under the new organization of industrial administration, the plan could be co-ordinated on a regional basis through the construction of regional input-output balances.

Along with these possible advantages, the adoption of the input-output approach would entail some possible disadvantages. Primary among these is the loss of contact between planners and economic administrators during the balancing stage of plan construction and thus the loss of the opportunity to apply pressure on planned production techniques at this stage. It is true, as we have argued, that under the material balances method this pressure is often overapplied, resulting in unrealizable, excessively tight plans. But the ability to apply pressure as late as the balancing stage does have its advantages. For it is at this stage that the bottlenecks can clearly be identified—that it can be seen just where the pressure needs most to be applied. This problem may indeed be one of the reasons why many Soviet economists say that input-output techniques will not completely supplant the material balances method but will be used along with it in the form of an auxiliary method. Unfortunately, however, they do not describe how this might be done. To fill this gap, a possible model is suggested in an appendix to this paper.

III

While it may be true that not all economists in the West are convinced of the value of input-output, as applied in the West, it should be kept in mind that in the Soviet Union under the present organization of planning it is necessary for the central planners to plan the flows of the intermediate goods to assure the internal consistency of the plan. Thus, the appropriate question is not whether input-output is an ideal method, but whether it would be a more efficient balancing method than the one currently used by Soviet planners—the method of material balances. In the opinion of many Soviet economists and planners (and in our opinion) it would be.

Yet certain limitations of input-output should be kept in mind. Input-output applied to Soviet planning in the way described in this paper is a device for assuring the internal balance of the plan. It is not a device for achieving a rational plan, one in which the rational allocation of resources was assured. However, to some extent it may be said to aid in this direction.[7]

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[7] The following ideas are developed further in a paper, "Toward a Theory of Value in Centralized Economic Planning," delivered by Mr. Richard Judy and the writer at the 1960 meetings of the Econometric Society and now being revised for publication.

The use of input-output by Soviet planners would not get the Soviet economy to its theoretical production possibilities frontier, but it might very well get it closer. Using the model of a two output, two input economy, the production possibilities frontier is defined as the locus of output points which for every attainable level of output of one product give the maximum amount of output attainable for the other product (with given resources and technology). Its relationship to the inputs and technology available can be illustrated through the use of the familiar box diagram, the two horizontal sides of which represent the total supply of one input and the two vertical sides of which represent the total supply of the other input. The production function of one product is drawn in a northeasterly direction from the lower left-hand corner and the production function of the other product is drawn in a southwesterly direction from the upper right-hand corner. The locus of tangencies of the two sets of isoquants is then the production possibilities frontier (when transposed to product axes) and the input combinations along this locus are the ones necessary to bring the economy to a point on its production possibilities frontier.

It is the input norms which determine at which point on an isoquant (combination of inputs) a Soviet firm will produce. It would only be by chance that this point would be on the locus of tangencies, for Soviet planners do not possess the type of information needed to calculate the appropriate input norms. This information is of the type provided by a smoothly functioning price system in which prices indicate the true relative scarcities of the input materials. But Soviet materials prices do not provide meaningful information of this sort. Therefore, little reliance can be placed upon them in calculating input norms and as a result Soviet norms are based primarily on technical considerations rather than on economic price considerations.[8]

The use of input-output in place of material balances to achieve balance in the plan does not directly affect the calculation of input norms, for the input-output method is not concerned with the problem of choice among alternative production processes.[9] There is no reason, therefore, to assume that the use of input-output will put the economy on its production possibilities frontier. Both input-output and the material balances method give rise to points (combination of outputs) on product transformation curves lying within the production possibilities frontier.

Given the initial reality of the input norms employed, the plan constructed by the input-output method will always be a feasible plan, but a plan constructed by the material balances method, as we have argued, need not be. If the material balances plan is well balanced and is thus feasible, then it will be on the same product transformation curve as the input-output plan. But if the material balances plan is poorly balanced, as it often is, then the input-output method will move the economy closer to the production possibilities frontier and thus in this sense will improve the allocation of resources.

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[8] The major stress in Soviet calculation of input norms is not on finding the point where an isoquant is tangent to a materials price line but is rather on an unambiguous movement of the isoquant itself; i.e., a movement of the isoquant in toward the origin. This is the theoretical meaning of the pervasive drive to lower input norms.

[9] Linear programming methods, however, are relevant in this regard.

A second way in which input-output may aid the rational allocation of resources is related to the possibility it provides of constructing a number of balanced variants of the plan as opposed to the barely one variant possible under the material balances method. The problem of the rational allocation of resources in a centrally directed economy can be viewed as the choice by the political leaders of their preferred point on the economy's production possibilities frontier. While input-output will not give planners the ability to supply the political leaders with points on a production possibilities frontier, it does permit the planners to present to the political leaders a number of points on a feasible product transformation curve (lying within the production possibilities frontier). The political leaders can then choose the point they prefer by trying in a sense to find where this product transformation curve is tangent to a leaders' indifference curve. Moreover, since the plan is initially constructed on the basis of the general priorities of the political leaders as communicated to the planners in stage two, the plan variants will all lie in an arc of the feasible product transformation curve in the area of the leaders' dominant preferences rather than being strewn all over the curve. This will mean that the political leaders will have more of a chance of picking a point close to the theoretical tangency point between the transformation curve and their indifference curve; thus again aiding the rational allocation of resources.

In sum, then, input-output offers Soviet planners the possibility of significantly improving their short-term planning techniques.

At present the Soviets are still in the experimentation stage, seeking ways of adapting input-output to their planning problems. Their most ambitious experiment to date has been an empirical input-output table constructed for the year 1959 in two variants: an approximately 80-order table in value terms and an approximately 160-order table in physical terms.[10] And we have recently been informed that they are now at work on a 350-order planning table for 1962, one in which the direct input coefficients are planned coefficients rather than empirically derived ones. This table will be compared with the state plan for 1962 and with the actual performance of the economy in that year, and will serve as an important step forward in the adaptation of input-output to Soviet planning.[11] Undoubtedly this experimentation will continue for some time, but it appears that the day is approaching when the first attempts at actual use of input-output techniques in Soviet planning will be made. Western observers wait with interest.

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[10] See M. Eidelman, "Opyt Sostavleniia Otchetnogo Mezhotraslevogo Balansa," *Vestnik Statistiki*, 1961:7, pp. 9-31.

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[11] V. S. Nemchinov, *Application of Statistical and Mathematical Methods in Soviet Planning* (Report to the International Conference on Input-Output Analysis, Geneva, 1961), Moscow, 1961, pp. 18-23; and N. Kovalev, in *Planovoe Khoziaistvo*, 1961:8, pp. 19-20.

APPENDIX

A MATHEMATICAL MODEL COMBINING THE MATERIAL BALANCES AND INPUT-OUTPUT METHODS

Let, $[A]$ = matrix of input norms
X_s = vector of originally planned supplies
Y = vector of originally planned final outputs
X_d = vector of the calculated demands

Then, the first attempted balancing of the material balances may be depicted in the following way:

$$[A]X_s + Y = X_d \tag{1}$$

Now, let us say that at the first attempted balancing of the material balances, a number of discrepancies between the originally planned supplies and demanded outputs appear. Let us say they are all shortfalls, i.e., $X_d \geqslant X_s$. At this point, Gosplan applies pressure on some input norms, thus changing $[A]$ *into* $[A^*]$, and it also reduces some of the originally planned final outputs, thus changing Y into Y^*. This causes X_d to be reduced to X^*_d, where $X^*_d = [A^*]X_s + Y^*$. But still there remains (let us say) a number of shortfalls, i.e., $X^*_d \geqslant X_s$.

Now, let ΔX = the unknown vector of changes in X_s, now necessary to get a consistent set of material balances. Set up an input-output equation,

$$[I\text{-}A^*]\ \Delta X = (X^*_d - X_s)$$
$$\Delta X = [I\text{-}A^*]^{-1}\ (X^*_d - X_s) \tag{2}$$

Add ΔX to X_s to get a new level of planned supplies X^*_s ($X^*_s = X_s + \Delta X$) and the plan will be balanced:

$$[A^*]X^*_s + Y^* = X^{**}_d = X^*_s \tag{3}$$

(Proof of (3) is relatively simple, once it is seen that:

$$[A]\ [I\text{-}A]^{-1} = [I\text{-}A]^{-1} - I)$$

THE SCALE OF SOVIET INDUSTRIAL ESTABLISHMENTS*

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Decisions with respect to the scale of industrial establishments have been an important if little explored aspect of Soviet industrialization policies. Both the so-called "underdeveloped countries" and that overdeveloped branch of economics, the theory of returns to scale, may draw interesting lessons from the Soviet experience. And, far from being of a purely historical interest, our topic is intimately related to the future trends of Soviet economic growth.

First, a few definitions. An industrial establishment is a unit of production such as a plant, factory, mine. Its scale is measured in terms of physical output. Information on the capacity of blast furnaces and turbogenerators is also included. All average figures quoted are arithmetic means but the trends shown are not significantly affected when medians are used instead.

The average scale of Soviet industrial establishments has increased very significantly under the Five Year Plans, i.e., since 1928, in virtually all of the more than forty industries for which estimates could be made. The percentage increase has tended to be the highest in heavy industry and in the production of those consumer goods where newly built plants accounted for the bulk of output. The increase was less pronounced in such traditional Russian industries as sugar or cotton textiles. Numerical findings for five selected industries, shown in Table 1, illustrate these tendencies. They indicate that, between 1928 and 1960, annual output per establishment rose sixteen times in the pig iron industry, six times in cement, four times in underground coal mining, three times in beet sugar processing; the average kilowatt capacity of district (*raionnye*) electric power stations rose four times. The rate of increase was dramatically stepped up under the current Seven Year Plan (1959-65). As shown in the last two columns of Table 1, the Russians have often been successful in their self-imposed race: to catch up with and surpass the scale of the American factories and mines. The processes just described were primarily due to the large scale of the new projects. The policy of enlarging some of the older establishments and closing down smaller ones worked in the same direction.

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* I wish to express my gratitude to Professor Abram Bergson for valuable advice and critical comments.

TABLE 1

THE SCALE OF SOVIET INDUSTRIAL ESTABLISHMENTS, 1913–60
SELECTED INDUSTRIES AND YEARS

Industry and Measure	1913	1928	1940	1960	1965 Planned	U.S.S.R. as % of U.S.A.	
						1928	1958
1. Iron and steel							
Average useful capacity of blast furnaces, in cubic meters[*]	190	290	600	909	1,115	49[†]	89[‡]
Annual output of pig iron per blast furnace, thousand tons	24	47	194	390	550	23	112
Annual output of pig iron per establishment, thousand tons	48	82	392	1,335	2,000	32	117[§]
2. Cement							
Annual output per establishment, thousand tons	46	68	131	401[**]	735	33	127
3. Electric power							
Average rated capacity of a district station, thousand kilowatt	18	27	n.a.	103[††]	n.a.	n.a.	n.a.
4. Beet sugar processing							
Daily throughput of sugar beet per mill, tons	573	631	811	1,205[‡‡]	n.a.	63	61
Annual output of sugar per establishment, thousand tons	7.1	8.2	10.5	22.3[**]	30.9	n.a.	n.a.
5. Coal mining, underground							
Donets coal fields, annual output per mine, thousand tons	21	62	262	227[**]	n.a.	89	360[§§]

[*] As of January 1 of each year. [†] 1930 for both countries. [‡] 1957 for U.S.A.
[§] The U.S. figure refers to output capacity rather than actual output.
[**] 1958. [††] 1955. [‡‡] 1957. [§§] 1953 for U.S.A.

Giantism

Soviet policies with respect to the scale of industrial projects can be characterized roughly as a set of variations on the theme of giantism. That movement started in 1929 when the original draft of the First Five Year Plan was scrapped as being too conservative, and both the output goals and the size of the new projects, from which the bulk of the additional output was to come, underwent a series of drastic upward revisions. The sky was soon the limit. Coal mines of 10 million tons annual capacity were being designed (some 4 times larger than the world's largest mine and some 150 times larger than an average Soviet mine then in operation), the world's largest cement works of 930,000 tons, steam condensing power stations of 1 million kw., etc. At the same time, hundreds of smaller projects included in the original draft were being dropped, even when they were complementary to the "giants" themselves. Giantism reached its peak around 1932, was condemned in 1938, and revived, in a modified form, in 1950.

The early giantism can be defined as the propensity to construct, regardless of the existing conditions, only very large—wherever possible "the world's largest"—projects, in the expectation of sensational economies of scale. The major moving forces of giantism appear to have been: Marxist doctrine, with its emphasis on the increasing returns to scale; the reasons of administrative convenience; some peculiarities of Soviet cost accounting; prestige considerations; and, perhaps most important of all, the often uncritical imitation of the American models.

Marxist theory of production was itself a product of the age of steampower and railroads. Marx emphasized accordingly the centralizing effects of these laborsaving innovations and tended to equate technological progress with an increase in the scale of production units. He viewed these processes, however, in a broad historical perspective as essentially long-run developments and not as an operational guide to actual investment decisions. More than that: Marx's doctrine of historical relativism could actually be interpreted as favoring smaller plant-sizes in Russia than in the more advanced industrial countries such as the U.S.A. This interpretation was actually advanced, i.a., by some of Russia's foremost Marxist economists at the time, including Bernshtein-Kogan, Krzhizhanovsky, Ginzburg—all of whom firmly opposed giantism, thus exposing themselves to more than the usual professional hazards. For all its pervasive influence on the climate of opinion, Marxist economics per se was neither a necessary nor a sufficient condition for the emergence of giantism in Soviet economic planning.

The Marxist slant of Soviet cost estimates on which investment decisions were supposedly based may have contributed to giantism. By understating interest and rent charges such estimates made the capital- and land-intensive mammoth-size projects appear more attractive. Equally important was the neglect of transportation inputs in such estimates, for which there was no doctrinal justification, and optimistic underestimation of the large plants' operating costs. The resulting bias reflected not so much the designers' Marxist beliefs as their lack of experience and wishful thinking.

The argument once advanced by Walter Eucken[1] appears more convincing; namely, that giantism is inherent in the very institution of centralized economic planning rather than being due to the planners' ideological commitments. The insight that the smaller the number of production units, the easier it is to plan, administer, and control them, undoubtedly contributed both to giantism in industry and to the collectivization drive in Soviet agriculture, the two policies coinciding in time.

But the most important single source of giantism appears to have been the resolute drive to imitate and surpass the size of the largest American establishments, in the hope of thus attaining superior efficiency. Steeply increasing returns to scale were assumed to operate in both countries (empirical evidence was surprisingly scant), but the optimum scale of plant was believed to be larger in the U.S.S.R., due to the absence of competitive waste and duplication, the greater scope for standardization, and the guaranteed, stable, and rapidly expanding markets. This view that what is good for the U.S. is even better for the U.S.S.R. is strikingly highlighted in an authentic description by G. K. Ordzhonikidze of Stalin's crucial decision on the output capacity of the Magnitogorsk steel works—a decision which set giantism in motion in other industries as well. After scrapping the elaborate calculations made by Professor Ginzburg, and jailing their author, "Comrade Stalin asked what is the size of American plants and was answered that large works in the U.S.A. produce 2.5 million tons of pig iron a year. Comrade Stalin said that such a plant must be constructed here, at first with a capacity of 2-2.5 million tons, which will then be expanded to 4 million tons. The Party and the country decided to erect such a plant."[2]

Soviet leaders overlooked significant differences between the two countries as regards factor endowment (in particular, the relative scarcities of capital and labor), the urgency of demand, the physical size of the markets, the availability of skills and other important complementarities involved in their decisions.

Once "the world's largest projects" gained the official support and were accorded a high priority in the allocation of resources—an important factor in the bottleneck-ridden economy of the thirties—a cumulative process set in. Each industry and each region pressed, in the best pork-barrel tradition, for giants of its own. Prestige considerations and "local patriotism" were involved, as exemplified by Kazakhstan's request for a mammoth-size automobile plant on the grounds that "if Bashkiria has the right to have an automobile factory, why should not Kazakhstan have one as well? Why should we not . . . erect giant machine building works utilizing imported [*sic*] raw materials? Kazakhstan is fully entitled to get such projects."[3] That local pressures for the giants are not a thing of the past is shown by a more recent (September, 1961) appeal by L. Kunaev, Kazakhstan's First Party Secretary. He criticizes the recommendation made by the Soviet Academy of Sciences to build an iron works equipped with four blast furnaces in Kazakhstan and asks instead for several establishments of twelve blast furnaces each. He adds: "They can reply that this is gigantomania. Such giant plants would be indeed an impermissible and superfluous luxury for countries such as, say, Spain." But apparently not for Kazakhstan.[4]

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[1] W. Eucken, "On the Theory of Centrally Administered Economy," *Economica*, 1948, p. 95.

[2] G. K. Ordzhonikidze, *Izbrannye statii i rechi* (Moscow, 1945), pp. 276-77.

International as well as domestic prestige considerations were involved: each of the "world's largest projects" represented a precious and fully exploited propaganda asset, showing the alleged superiority of the planned, socialist economy of the U.S.S.R.

Subsequent Policies

At the Seventeenth Party Congress, in January, 1934, Molotov criticized the excesses of giantism, and even earlier, perhaps in a tacit recognition of diseconomies of scale, some of the most widely publicized "supergiants," such as 10 million tons coal mines, had been quietly shelved. But a general policy reversal did not come until a decree dated February 26, 1938, proclaimed "the fight against gigantomania" which was now blamed for lengthening construction delays and for a wasteful utilization of transportation facilities and of raw materails. Upward limits were placed upon the scale of new projects to be launched under the Third Five Year Plan (1938-42), e.g., 24,000 kw. for steam condensing power stations, 90,000 tons for coal mines, etc. The practical effects of the new policy were, however, negligible: the concurrent defense build-up reduced sharply the amount of resources available for new investment, and what remained was largely committed to the completion of the large projects inherited from the previous years.

The average size of plant declined very considerably during the war, between 1940 and 1945, by 32 per cent in pig iron production, by 60 per cent in coal mining, by 61 per cent in sugar industry, etc.

After the war, lip service continued to be paid to the guidelines of "the fight against gigantomania" until about 1950, when the grandiose "Stalin's Plan for Transformation of Nature" was launched. It provided, e.g., for construction of the world's largest hydroelectric stations, in Kuibyshev and in Stalingrad, which immediately received top priority in the allocation of scarce resources and promptly started a new upsurge of interest in very large establishments throughout the economy. It is interesting to note that, just as the early outbreak of giantism, in 1929, coincided with the all-out collectivization drive in agriculture, its renewed upsurge in 1950 occurred simultaneously with Khrushchev's abortive proposal to revamp Soviet villages into large "agrocities," and with the more successful policy of amalgamation of collective farms, in search of economies of scale, as the result of which their number declined (in thousands) from 252 in 1949 to 45 in 1960, sown area per farm having increased more than sixfold.

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[3] Trudy pervoi konferentsii po razvitiiu khoziaistva Severovostochnogo Kazakhstana, Alma-Ata, 1931, pp. 58-59, quoted in *Za Industrializatsiiu*, Apr. 12, 1932.

[4] L. Kunaev, "Bogatstva Kazakhstana na sluzhbu kommunizmu," *Kazakhstanskaia Pravda*, Sept. 20, 1961.

In industry, the renewed preference for very large establishments was gathering momentum without much publicity throughout the early fifties, came to the foreground after the Twentieth Party Congress in 1956, and has remained a keynote of Soviet investment policies ever since, reaching a new high with the just announced twenty-year program of transition to communism. According to the foremost Soviet authority in the field, Professor Itin, a further increase in the plant sizes will play "a decisive part in creating the material base for Communism."[5] As in 1929, the steel industry furnishes some striking illustrations of the progress of neogiantism. A few years ago, there was talk of building new steel works of some 2.5 million tons annual capacity, then of 6 million tons, of 12, and now a 24 million tons project is planned and hailed as "the enterprise of the future." Cement works of 2.5 million tons are being designed, hydrostations of 4 and 6 million kw., steam condensing stations of up to 3 million kw. Hydroturbines of 500,000 kw. and steam turbogenerators of 800,000 kw. are planned. Enlargement of the old establishments plays an important part: the present output capacity of the Magnitogorsk steel works, e.g., of 6 million tons, is to be doubled.

Appraisal

I will follow the useful precedent established by F. D. Holzman in his study of the Ural-Kuznetsk combine and differentiate between "a short run (say ten years') perspective [and] a longer run (say thirty years') perspective."[6] The conclusions presented within this context are mainly based on a study of the relationship between various production coefficients on the one hand and the scale of establishments on the other, in five selected industries. Given the limitations of space, I will not explain in detail any estimating procedures.

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[5] *Ekonomicheskaia gazeta,* Nov. 20, 1961, p. 5.

[6] F. D. Holzman, "The Soviet Ural Kuznetsk Combine," *Q.J.E.,* Aug., 1957, p. 399.

TABLE 2

AVERAGE OUTPUT CAPACITY OF NEW PROJECTS PUT INTO OPERATION DURING VARIOUS PERIODS, U.S.S.R., 1928–65 PLANNED

Industry and Measure	I FYP* 1928–32	II FYP 1933–37	III FYP 1938–40	1928–40	WW II 1941–45	IV FYP 1946–50	V FYP 1951–55	VI FYP† 1956–60	Seven Year Plan 1959–65
Iron and steel									
Average useful capacity of new blast furnaces, cubic meters	760	983	1,012	865	842	911	1,124	1,354	1,758
Cement									
Average designed annual output capacity of new establishments, thousand tons	152	176	140	159	n.a.	336**		540	680
Electric power									
Average rated capacity (in thousand kw.) of new									
a) turbogenerators	10–24	25–50	26	n.a.	n.a.	24	34	100	n.a.
b) hydrogenerators	n.a.	n.a.	26	n.a.	n.a.	51	57	n.a.	n.a.
Beet sugar processing									
Average daily throughput capacity of new establishments, tons	1,140	990	2,300	1,200	960	775	1,445	1,720	2,375§
Coal mining, underground									
Average designed output capacity of new mines, thousand tons a year									
Donets coal fields	480	610	375 pl.	535‡	n.a.	n.a.	235	410	n.a.
Kuznetsk coal fields	365	800	335 pl.	600	160	290	845	n.a.	1,340
All U.S.S.R.	385	510	270	375	165	250	335	n.a.	570

* FYP—Five Year Plan. † The Sixth Five Year Plan was scrapped in 1958 and eventually replaced with the Seven Year Plan. All figures in this column are planned rather than actually realized magnitudes. ‡ Refers to 1928–37 only.
§ Refers to 1959–61 only. **Refers to 1946–55.

In the thirties, the main short-run effect of the increase in the scale of production units (except possibly in the machine building industry) was apparently to aggravate the existing bottlenecks and to create some new ones. Soviet planners had failed to appreciate the importance of the complementarities involved in the construction and operation of very large, highly mechanized, and often narrowly specialized establishments. Given the contemporary scarcity relationships, these complementarities often ran in the wrong direction. The new large plants saved on factors of production that were in relatively abundant supply, mainly labor in general. They raised demand per unit of output for factors that were in desperately short supply; capital in general and imported capital goods in particular; skilled and highly skilled labor; top-notch management; highly processed and regularly supplied raw materials; social overhead; and, last not least, transportation. To quote a Soviet writer, "in no other country in the world is there such a constant battle with space. . . . No other country has such huge distances to overcome. . . ."[7] Giantism added significantly to those distances.

Given the shortages of the required complementary inputs, the performance of most of the new plants failed to come up to the planners' expectations. But what annoyed the time-conscious planners most were the extremely long gestation delays associated with mammoth-size projects. To give a typical example, ten small coal mines of 100,000 tons annual capacity each could be built within fifteen months. But it took an average eight years to complete construction of one large mine of 1 million tons capacity and an additional warm-up period of several years during which the mine operated at only a fraction of its designed capacity. These unexpectedly long gestation delays ran contrary to the planners' time preference and to their very concept of industrialization which was conceived as a battle against time, on the premise of an imminent armed conflict with the capitalist world. Their high marginal rate of impatience and their time horizon were authoritatively stated by Joseph Stalin, during the First Five Year Plan: "We have fallen behind the advanced countries by as much as 50-100 years. We have to overcome this lag within one decade. Either we accomplish this, or we perish."[8] A decade later, however, most of the large projects then launched were still fighting what was euphemistically called "infantile diseases" while others were still under construction.

Let us now appraise current Soviet policies. "The world's largest projects" being built in the U.S.S.R. now tend to find a far more receptive and suitable environment, mainly on account of a shift in scarcity relationships that has occurred since the thirties and that favors a larger optimum scale of plant. Partly as the result of wartime losses, labor is now relatively scarcer and capital more plentiful. With some exceptions, such as the cement industry, even the largest and most complicated pieces of equipment can be manufactured domestically, eliminating the unfavorable balance-of-payments effect of the prewar giantism. Skills necessary to build, operate, and manage very large factories and mines have been acquired. Mineral deposits were more adequately prospected and many more sites suitable for very large production units were discovered. In a number of industries, technological progress since the thirties was also conducive to an increase in the scale of plant. On the demand side, domestic markets have expanded and foreign markets were acquired. Recent measures aiming at an international division of labor within the Soviet bloc further increase the potential scope for economies of scale.

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[7] A. B. Markin, *Soviet Electric Power, Development and Prospects* (Moscow, 1956), p. 67.

[8] I. V. Stalin, *Voprosy Leninizma*, 11 ed., pp. 328-29.

The current policy of increasing the size of production units appears more justified and is likely to be more successful under these circumstances than it had been in the thirties, even though one suspects that the 24 million tons steel works and other such colossal "enterprises of the future" may (and perhaps would better) remain unrealized.

Looked upon from a long-run perspective, even prewar giantism itself appears more defensible. Some of the plants that had been total failures in the thirties perform very adequately at present (although they are often new plants under old names having been rebuilt and modernized since the war). But this improvement would have been a small consolation indeed to the hard-pressed Soviet planners of the thirties. Given their time horizon and their expectations, they might have shrugged it off with the Keynesian, "In the long run we are all dead."

Our appraisal of Soviet investment decisions should be differentiated further according to the industry in which they occurred. Indivisibilities occur not only in the fixed capital equipment (the case emphasized by the Soviet planners) but also in methods of production and in the product itself. Production of many types of machinery or the use of highly efficient flow methods, assembly lines, etc., presupposes a large scale of output. The giantists' main error was to generalize from such cases to all industries, to postulate that diseconomies of scale were nonexistent, and to discriminate unnecessarily against smaller scale establishments.

Local conditions, such as the density of demand, the availability of raw materials, justify construction of establishments of widely varying sizes in many industries. In others, small-scale units may represent the optimum solution. The insight that each case should be judged on its own merits rather than on the basis of hard-and-fast dogmatic assumptions seems to be gaining currency among Soviet economists. One tends to agree, e.g., with L. V. Kantorovich, who concludes in his appraisal of prewar investment decisions: "Some of these projects, such as the Magnitogorsk works, justified themselves brilliantly. Others, for which a correct cost calculation would yield a low coefficient of effectiveness, did not justify themselves. Here belong the giants of the food industry, some hydrostations which have remained underutilized for years, and others."[9]

Such views are indicative of the far greater freedom of discussion among Soviet economists than had prevailed under the early giantism. The neogiantists hold the spotlight but not the monopoly in Soviet economic planning today. In fact, plants and mines of widely varying sizes tend to be built in most industries, mainly due to the explicit recognition of the role of demand, of transportation inputs, and construction delays as determinants of the optimum plant scale.

Comparison with China

If Soviet planners borrowed the prototypes for their early giants from the U.S.A., the Chinese took their ready-made from the U.S.S.R. The cornerstone of China's First Five Year Plan (1953-57) were 156 large projects built with the Soviet aid. In 1957, however, it was stated:

> A deviation has existed where we have set our minds on big scales and large outfits. . . . If emphasis is laid on the development of large enterprises to the neglect of medium-size and small ones, investments will be long tied down, industrial growth can only crawl forward, the national economy will be out of gear, full and timely utilization of resources will be impossible, local activism will be cramped, and the multifarious demands of the people cannot be met. All this is very harmful.[10]

As if this were not enough, it was claimed, in a revealing comparison of small (annual capacity of less than 10,000 tons) and large (900,000 tons) coal mines that the former have 2.4 times lower production costs, cost sixteen times less to build per unit of capacity, and take only one year to reach their full capacity against seven to eight years needed by the large mines.

A policy of "walking on two legs" was adopted, meaning a simultaneous development of large- and small-scale industry. The latter is identified with "indigenous," "native," and treated with patriotic overtones: "the small factories are frequently the vanguard of technological revolution. Many things which cannot be carried out with foreign techniques, can be carried out with indigenous techniques."[11]

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[9] L. V. Kantorovich, *Ekonomicheskii raschet nailuchshego ispol'zovania resursov* (Moscow, 1959), p. 223.

[10] Jen Min Jih Pao editorial, June 16, 1957, translated in: *Survey of Chinese Mainland Press,* June 27, 1957, pp. 9-11.

We all know the consequences of what might be called pygmyism in action: construction of thousands of backyard blast furnaces, backyard chemical works, pocket-size coal mines, etc. Many of them turned out to be highly inefficient and even wasteful: much of the backyard pig iron was unfit for steel production. These excesses were, however, partly eliminated and, in any event, they do not discredit the policy of "walking on two legs." They rather suggest that small-scale establishments are not fit for all industries—the reverse of the lesson of the Soviet giantism.

The Soviet and Chinese experience suggests that the seemingly dated, old-fashioned concept of a U-shaped average cost curve may bear further examination. The available evidence related to returns to scale—in Soviet industry, in particular—may throw some light on this important matter.

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[11] Hung Ch'i, June 16, 1960, translated in: *Excerpts From Chinese Mainland Magazines*, No. 219, 1960, pp. 36–41.

ON PATTERNS OF TECHNOLOGICAL CHOICE IN SOVIET INDUSTRY*

By DAVID GRANICK
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Early Soviet industrial development—meaning by this its development during the period of the first two Five Year Plans—is commonly acknowledged to have been extremely rapid by international standards. As such, it inevitably exerts a strong attraction on the governments of underdeveloped nations. There is a natural interest in seeing what lessons can be learned from it. This paper concentrates on one such lesson.

In trying to explain this rapid rate of development, three different lines of explanation have been pushed by various Western scholars. The main explanation given is the high proportion of national income set aside for investment, and the fact that such investment was directed primarily into the expansion of directly-productive rather than social capital. This investment was accompanied by a large influx of labor into industry and construction; since this labor force was more pushed out of agriculture than pulled into industry, such relocation of human resources did not interfere with a program of restricting consumption to the advantage of investment. The policy of pumping both capital and labor resources into industry was made possible only by a Draconian social and political strategy whose repressive imprint on all aspects of Soviet life remained firm for a quarter of a century thereafter. Nevertheless, it did provide a solution to the problem of circumventing the stagnation trap which had so badly frightened Soviet economists during the middle and late twenties. It provided a means of resolving or avoiding many of the worst problems preventing "take-off" in underdeveloped countries, as these problems are discussed in standard texts.

A second explanation offered has been in terms of external economies and balanced growth, making economical a host of investment decisions which would not have been appropriate if considered individually. This balanced growth (in Nurkse's sense of the term) was a natural accompaniment of a national investment program centrally planned and implemented. However, work such as that of Franklyn

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Holzman on the Ural-Kuznetsk combine casts doubt on the net economies involved in such centralization; for central decisions of this sort which turn out to have been mistakes are, as S. Herbert Frankel has pointed out in other connections, major wastes of resources rather than minor ones.

A third explanation is one of efficiency, arguing for the peculiar ability of a centrally-planned economy to adopt production functions within individual sectors of the economy which take account of the social marginal cost of the various factors of production rather than relying on their private or money costs. In a very crude fashion, an approximation to a system of linear-programming shadow prices can be used. Particularly in view of the relatively high money-wage costs in large-scale industry which are commonly encountered in nations developing in this century, Soviet production functions may have been unusually rational in terms of producing a given output mix at lowest social costs—unusually rational, that is, by the meager but relevant international standards of developing countries.

This view is reinforced, particularly as it relates to capital-labor substitution, in that the main Galenson-Leibenstein argument for the use of capital-intensive production functions in underdeveloped countries is largely irrelevant to the Soviet economy. Since the volume of investment and, thus, national *ex post* saving, is centrally determined, there is no dynamic argument for trying to keep down the number of wage earners as a means of preventing a decline in the national marginal propensity to save. Thus Francis Bator's argument that the fastest growth is achieved by maximizing the nation's output at each moment of time really comes into its own.

The explanation of high Soviet growth rates as a result of unusual rationality in the choice of production functions was developed in opposition to the view that the Soviet economy is characterized by unusual irrationality in production resulting from a peculiarly inappropriate explicit pricing of production factors. Whether in fact the net balance is toward greater rationality or irrationality than that found in other countries at early stages of development seems still to be a moot point. Thus this third explanation (proper choice of production functions) for rapid Soviet growth is yet very much in question, just as is the second explanation in terms of external economies. We are left with unanimity only as to the first explanation; namely, success in mobilizing and directing resources.[1]

[1] The Soviet economy's freedom from the business cycle contributes relatively little to the explanation of its rate of growth during such a brief period as that of two Plan periods. This is entirely aside from two questions which have been raised about such freedom: one relating to whether there is not, in fact, some cyclical behavior in the form of cessation or slowing down of growth in the trough years; the second, to be taken more seriously in my view, regarding a compensating cost in the Soviet economy due to disguised industrial unemployment and below-capacity operations of specific industries.

These explorations of the Soviet industrial growth process all seem helpful in providing insight into factors affecting growth in relatively underdeveloped countries generally. However, all three fail to deal with qualitative changes in the inputs into the economic system; at best they treat only quantitative increases. Yet economic development to a large extent consists precisely in changes in the quality of the inputs (labor skills, management organization, technology, etc.). Can Soviet experience help us to treat these aspects by suggesting major alternative decisions to those taken (accepting as given the Soviet planners' major objectives) and by evaluating these alternatives?

In this paper, I would like to examine the interlinked aspects of the technological development of the metal-fabricating industries of the Soviet Union during the period of the first two Five Year Plans seen against the standard of alternative development paths which were clearly known to Soviet planners of the time, whether or not they were being implemented anywhere in the world. Can we find alternatives which would appear to have been more promising as a means of economizing scarce resources, whose choice might have made a major difference in the path of Soviet growth in these industries, and which were rejected or slighted? In asking this, let us restrict ourselves to those alternatives which are still technologically relevant to the economies of developing nations in 1961, not having been superceded by more recent inventions.

This exercise does not test Soviet decisions for their rationality. The alternative pattern proposed here is one which, at the time, was not clearly indicated by any existing body of knowledge. My purpose is rather to indicate a promising alternative road which might make current development easier in lands wishing to profit from past experience. For this purpose, it is not necessary for me to demonstrate that, in the specific Russian environment of the early thirties, my alternative would have better served the Soviet purpose. Instead, I have the more modest objective of arguing that the alternative seems to have been sufficiently promising, and to have had a sufficient potential pay-off, to be worth investigating further in application to countries whose conditions might make the alternative even more promising than it was in Russia of the early thirties.

The first part of this suggestion relates to the issue of shift-work. At the beginning of the First Five Year Plan, Soviet metal-fabricating industries mainly worked a single shift for six days a week. An obvious complement to, or substitute for, a mass investment program of expanding existing plants and building new ones was to change over to a round-the-clock utilization of existing facilities. Here was a cheap means at hand for greatly expanding the usable capital stock of the economy. During the entire First Five Year Plan, the period when capital accumulation was most difficult, the productive-capital stock of the metal-fabricating industries increased by some one and two-thirds times according to Soviet ruble measures. A doubling of the shift-utilization of existing factories would have provided for an increase in the services of capital stock of three-fifths of the actually realized rise in capacity.

The potential inherent in round-the-clock operations was fully recognized by Soviet administrators in the early thirties. The campaign for the three-shift and seven-day work week was the order of the day. Yet it was never very successful. Second and third shifts seem to have had very few workers, and the shift-coefficient (defined as the total number of workers divided by the number working in the main shift) in metal fabricating rose only to 1.50 by 1932, and then, after first declining somewhat, it stagnated.

Here was a continuing underutilization of industrial capital resources which was enormous in scope precisely at the time when the greatest of sacrifices were being made to expand this capacity. In dramatic form it raises the question: were these sacrifices necessary?

Plant utilization was an area where, by and large, Russian administrators were pushed back in the direction of a production solution which has been generally applied throughout Western Europe: that of the single shift. Even today, the United States is most exceptional among capitalist industrialized countries in the extent to which it employs multishift operations in industries other than those where technical requirements force its adoption. Perhaps the Russians had no choice. Let us examine some leading objections to multishift operation of plants and attempt to evaluate their force.

The objection to multishift operations most widely cited to me in interviews with British works managers during 1960 was the dislike of it by workers and the resultant difficulties in recruiting and maintaining a labor force. An element related to this was the wage expense resulting from the pressure to work a shorter shift than is customary in single-shift operation. Emphasis was also placed on the difficulties involved for individual factories engaging in multishift production in a country where workers depend on public transport which stops running at night.

Given the competition for workers by individual Russian plant managements during the thirties, these same objections doubtless prevailed there. But they applied only on the level of decision making of the individual factory. Central planners presumably had room to maneuver through restricting the number of workers who could be hired on a single shift in a given plant (such restriction was in fact made by type of worker, but never by shift), and perhaps even by enforcing substantial shift-differentials in earnings. At worst, they could have held down the demand for labor by restricting the volume of new construction. Certainly it is hard to believe that, in the climate of the early and middle thirties, Soviet planners gave great weight to the welfare aspects of workers' preferences for the day shift. Consideration of losses in labor-input due to reduction in hours worked per man was also no factor; the forty-one hour week governed during this period, and overtime in the metal-fabricating industry as a whole appears to have been negligible.

Doubtless a much more important obstacle to multishift operations was the requirement of good production planning in order to utilize effectively that type of work organization. A poor balance between the various kinds of equipment in a shop, irregular delivery of materials combined with the supply of metals of varying dimensions and quality, poor routing of work-in-process, drastic changes in product-mix, the absence of preventive maintenance and of spare parts which could be quickly installed in working machines—all these created the strongest demands for flexibility. An obvious means for achieving such flexibility was to schedule general equipment for one-shift operations and to work only the occasional piece of bottleneck equipment around the clock. Given the situation faced by individual plants, this was a reasonably operational solution—even if a very expensive one in terms of capital usage.

From the viewpoint of central authorities, however, alternatives did exist. In the light of the drastic shortage of steel, insistence on better adherence to tolerances of rolled metals was probably not a viable substitute; waste of capacity in metal-fabricating plant could be better afforded than lower steel tonnage. Use of extensive subcontracting as a means of achieving flexibility through breaking bottlenecks seems to have been beyond the capabilities of the planning-administrative system. But two other alternatives were available.

One was that of utilizing general-purpose equipment, arranged in departments according to type of equipment rather than according to product-flow. In view of the substantial potential for substitution between different types of machine tools in the performance of any particular process, this should have gone far toward raising the proportion of equipment in a plant which could be utilized at a particular moment. Soviet managers did indeed rely on general-purpose equipment for new investment—but its potential for flexibility was virtually eliminated through its arrangement both physically and in terms of administrative channels into product-flow organization. It would appear that only toward the end of the Second Five Year Plan was there a movement away from such an organizational pattern.

A second means for raising the proportion of capacity utilized would have been to add substantially to the number of engineers and technicians involved in planning production and maintenance on the plant and shop level, as well as in providing supervision in second and third shifts.

A third means would have been that of laying far greater stress than was in fact given to training machine operators to a point where they could be transferred from one type of work to another, and from one machine to another. This would have permitted a routine use of second and third shifts, with the movement of workers to different types of equipment according to need; such switching is quite common in many Western plants today.

The objection to these three approaches for permitting greater use of existing capacity was twofold. On the one hand, they would have meant a renunciation of the flow-type of production organization which gives the best technical results in large-series production—when it works. Such renunciation could be viewed as leading to the creation of the wrong kind of industrial complex—the job shop rather than the production line. It would have postponed the development of a type of production organization with a considerably greater potential than the one currently in use, instead of at least making steps in the proper direction. Here was involved a viewpoint of aiming for the technically preferable, regardless of its short-run effects.

Second, these approaches would have required a large addition of two very scarce types of labor to the labor force in existing plants; more engineers and technicians capable of production planning and also a larger number of rounded machinists would have been needed. Where were these to have come from?

The most obvious answer was to reduce sharply the volume of investment in the metal-fabricating industries. Such investment could have been restricted to eliminating bottlenecks in existing factories and to building new plants only where desired products were of a type which simply could not be otherwise constructed. What was the point —particularly when savings were so hard to come by—in building a new shop alongside an old one, and then being forced to run both at half throttle? Why spread thin the scarce resources of engineers, technicians, and skilled labor?

Furthermore, such economizing on new investment would have permitted greater attention to the training of skilled labor. It is true that FZU's were being organized; but many more could have been built. Much larger volumes of equipment could have been devoted to training purposes rather than to production. It is unlikely that much could have been done in speeding up the education of engineers and technicians; but a great deal could have been attained in the training of skilled labor. Much of this might even have been carried on in rural areas, thus relieving the ever growing urban pressure and so reducing the need for those social investments in the cities which could not be totally avoided as the city population grew.

The riposte to this argument is that the proposed solution would have been unnecessarily conservative. A great virtue of flow production and of the detailed breakdown of job functions is that it permits the utilization of unskilled and semiskilled operators instead of craftsmen. In this fashion, an unskilled labor force can be quickly utilized in industry—following the example provided by the American industrial expansion of the late nineteenth and early twentieth centuries. The time-consuming development of widespread apprenticeship systems on the British and German model can thus be obviated. Flow production is geared to the existing labor force and is designed to utilize it with a minimum of further training.

Furthermore, Soviet conversion to flow-type production with raw labor represented a major program of training-on-the-job. Large numbers of peasant youth could be brought into immediate contact with machinery and given a rudimentary education in its use and care. If their need was primarily that of becoming familiar with machinery and with factory discipline, perhaps no schooling in training shops would have been a satisfactory substitute—for these would never really have duplicated the strains of factory life. In fact, the widespread use of such schooling might even have amounted to developing craftsmen with a "trained incompetence" for adjusting to the speed and discipline of modern industry. Moreover, engineers and technicians could be most rapidly and successfully trained for the operation of complex factories by being placed in charge of such plants and departments—to sink or swim. From this point of view, existing factories were simply unsatisfactory; new ones had to be built to take advantage of the potentials of specialized, large-series production.

This riposte would be more convincing if it were not for two facts. One is that flow-line operations appear to create work conditions which are peculiarly unsatisfactory for new factory labor. Thus one reason given by Soviet authors for the high labor-turnover rate of the early thirties was worker dissatisfaction with routinized jobs barren of learning potential, and the expression of such dissatisfaction by moving on to another factory—where they were given similar work. A major problem of factory operation in the thirties thus seems to have been, partially at least, a product of the decision as to the type of production organization deserving emphasis.

A second fact was the limited period during which such flow-line production was in fact utilized. By the Third Five Year Plan, with the reduction in imports of equipment coupled with a need for a more complex product line going out to industrial consumers, factories tended to broaden their mix of products and so to depart from flow production. In short, this method of factory organization was abandoned—at least for some years—before its potential could be realized in greater efficiency.

But having said this, we are still left with a vital feature of the Soviet decision as to production organization: that it was a means of bringing very large numbers of raw peasant youth into direct contact with machinery in the environment of large factories, and that this was the major method used for training an industrial labor force. Could the labor force have been trained as well, or better, through more formal training programs?

I submit that we do not know the answer to this question as to preferable means of training. But it is a question well worth investigation by industrializing countries, for the Soviet answer was extremely expensive in capital costs.

To sum up, the Soviet choice during the first two Plans was to engage in heavy construction in the metal-fabricating industry. The factories which were newly built or reconstructed did not simply represent additional capital equipment, but rather they were installations designed in the main for flow-production of a limited number of products. The alternative suggested here would have been that of limiting capital investment in the industry primarily to the removal of bottlenecks, and instead to have concentrated on increasing the proportion of second- and third-shift workers. This would have meant a renunciation for the decade of the effort to employ large numbers of raw farm youth as machine operators, since it would have required a labor force mix of a higher median quality than that needed for flow-production operation.[3] Thus this alternative would have implied a far greater concentration on formal methods of labor training than was in fact given by Soviet administrators.

In this interpretation, the great product of Soviet investment in metal-fabricating industry during these early years was not physical product at all—but rather was an industrial labor force. It is indeed possible that it was worth the cost of this investment, as judged in terms of the planners' utility function, but one should be clear as to what the product of this gigantic effort really was; if we judge the pay-off of this investment by the resultant physical product alone, we would seem to be missing the main point.

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[3] In this way, another problem in multishift operations would have been met. Multishift operations encourage irresponsiblity by individual workers in the care of their equipment; for they do not bear sole responsibility for it. This consideration is of much greater importance in dealing with a raw labor force than with one having industrial experience and possessing industrial traditions of which they are proud.

Three side comments seem worth making. The first is with regard to output/capital ratios. In the conventional definition of output as referring only to physical product, the particular added output which is most important at an early stage of development may be ignored. This would present a strong reason for expecting—*ceteris paribus*—a sharp secular rise in the conventionally defined marginal output/capital ratio of industries developing on the pattern of Soviet metal fabricating. For, in time, the main product of such capital investment can be expected to change over from labor training to physical output.

A second remark is that this paper casts major doubt on a conclusion I have drawn in earlier articles: that Soviet metal-fabricating industries have carried on production by methods designed to achieve a maximum output/capital ratio. A policy of expansion of plant and equipment as an alternative to a fuller utilization of existing capacity is a major exception to this earlier generalization; and quantitatively it is likely to be of far greater importance than any misuse of capital resulting from the failure to employ a rate of interest when choosing production functions.

My final comment is with regard to the constraints on achieving economic efficiency which grew out of the nature of the Soviet planning system itself. I have argued elsewhere that Soviet inability, despite considerable effort, to develop subcontracting as an integral part of the metal-fabricating industry has led on a large scale to the use of inefficient production processes which would have been rejected if subcontracting had been a viable alternative. One might also lay a portion of the blame for Soviet inability to extend multishift production to this unavailability of subcontracting as a means of achieving flexibility. Here is another constraint on the efficient use of resources which seems to have been built into the economic system.

The Soviet decision in favor of new specialized plants in lieu of the more intensive use of existing general purpose ones may also have been affected by an ideological bias in favor of a rapid expansion of the proletariat as the mainstay of the Revolution. If so—i.e., if an increase in the number of industrial workers was considered a final good as well as an input in the planners' value system—then here would be an additional reason for the planners to have opted in the way they did rather than according to my suggested alternative. This should be viewed as an additional possible constraint—ideological in this case—of the Soviet system on the process of industrial development.

DISCUSSION

Lloyd G. Reynolds: I would like to comment on two points raised by Professor Granick's paper—one a matter of detail, the other a more general issue.

First, the question of single-shift operation. Looking back it seems odd that, at a time when capital was extremely scarce, Soviet planners did not make a greater effort to economize capital by working plants around the clock. I wonder how far Soviet methods of cost calculation may have contributed to this result. Second shifts are notoriously less productive than first shifts, and third shifts are even less productive. Average variable costs are correspondingly higher. Under our methods of calculation this can be more than offset, at least in capital-intensive industries, by a decline in unit overhead costs. But the understatement of capital costs in Soviet accounting, leading to heavy emphasis on direct costs, may well have led them to conclude that multiple-shift operation was prohibitively expensive.

I suspect also that political and bureaucratic considerations were important. To a revolutionary group, it perhaps seemed obvious that building a new industrial order implied building in the literal sense of throwing up new factories in all directions. Simply trying to get more output from existing plants must have seemed unexciting by comparison—"unnecessarily conservative," in Professor Granick's phrase. Engineers, who have been a key group in Soviet industrialization, are apt to be technical perfectionists. They like new plants in which they can embody not only new machinery but the latest ideas on production layout and work flow. And enterprise administrators in Soviet metalworking may have liked physical expansion for its own sake. The men in the blue serge suits over there may not behave very differently from the men in the grey flannel suits over here.

This is not to say that Soviet officials were right in relying so heavily on new plant construction and neglecting the potentialities of multiple shifts. But the considerations advanced by Professor Granick, and those which I have suggested, help to explain why this was a natural tendency in the circumstances.

A much broader issue—which Professor Granick raised but did not have time to develop—is how far the Soviet pattern of industrialization contains lessons for development planning in the poorer countries of the world. Here one must be cautious and discriminating. The Soviet experience is very uneven. Soviet planners—at least until quite recently—were notoriously neglectful of agriculture, housing, and the service industries. In the agricultural sector particularly I believe that the developing countries can learn much more from the U.S.A. than from the U.S.S.R. But in the manufacturing and utilities sectors, I think the newer countries are bound to be impressed by the Soviet experience, and it would be very unwise of us to overlook this.

Anyone brought up on the theory of resource allocation through a market mechanism can point out all sorts of waste and inefficiency in Soviet planning. Yet the U.S.S.R. has industrialized. Picking itself up by its bootstraps, it has changed in a relatively short time from a dominantly agricultural country to a powerful industrial nation. I do not think we yet know what have been the critical factors in this development. A high savings rate has obviously been important. But one should also give due weight to the transformation of the educational system and the heavy investment in human capital. The rapid increase in the output of scientists, engineers, teachers, managers, agricultural specialists, and other technicians is very impressive. So also is the system of night schools and in-plant training which enables people already at work to continue improving their skills and to qualify for promotion to higher jobs. If I were an Indonesian or a Nigerian and were selecting one feature of the Soviet experience for special study, I would focus on education and technical training.

The Soviet strategy of industrialization, with its high priority for heavy industry, of course makes sense mainly for countries with a very large population and resource base which can hope to get maximum advantage from external economies. It makes sense for India or Brazil, but not for Jamaica or Sierra Leone.

There is the further structural difference that the "countries of the South," which I find a convenient and neutral shorthand term for the less developed countries, typically have a substantial private industrial sector. This is from my standpoint a happy circumstance, but we should not exaggerate its significance. Public utilities and natural resource industries are almost universally under public ownership. Heavy manufacturing industries are often either owned or sponsored by government. And government has many instruments by which it can influence the course of events in private industry—lending powers, foreign exchange controls, building permits, tariffs, taxation, and the rest. I suspect that most governments in these countries will continue to follow an interventionist course, and that efforts to sell them liberal economic doctrine will have scant success.

But to the extent that government control in these countries is somewhat decentralized, they can perhaps learn more from the decentralized economic planning which goes on in Yugoslavia than from the original Moscow model.

I do not profess at this point to say how much the less developed countries might eventually learn from closer examination of what goes on in Belgrade and Warsaw and Moscow. I pose it simply as a problem which deserves our serious and open-minded attention. Whatever Western economists may say, I believe the countries of the South are going to try to learn from the East as well. And they may learn a good deal. Indeed, they may make more rapid progress in national economic planning than the Communist countries themselves, which are still in varying degrees hampered by Marxist preconceptions. We should all be grateful to Karl Marx. If the countries of the East could get Marx off their backs, then they might really "take off."

JAMES BLACKMAN: How do Soviet planners regard input-output and how should they regard it in view of the inadequacies of their present methods and the increasing complexities of their task? Professor Levine focuses on these important queries in his thoughtful and persuasive study.

A short time ago effective consideration of input-output was precluded in the U.S.S.R. by doctrinal taboos. Today, not only have such concepts been legitimized but their practical application also appears to be close at hand. It is perhaps worth noting that this year for the first time the Soviets have cast their official production statistics, at least in part, in the input-output mold. Thus their latest statistical handbook presents a 73-order table of intersectoral purchases for the year 1959. Reportedly, also, the Central Statistical Administration has prepared a table of commodity flows in physical terms (157 by 157) as well as a somewhat enlarged value matrix. These compilations have been heralded by Soviet economists as providing a useful basis for the elaboration of provisional plans. Meanwhile, as Professor Levine notes, more ambitious and up-to-date matrices are in the making.

The susceptibility of input-output matrices to computer handling, of course, gives them an invaluable edge in speed of solution over material balances which cannot be simultaneously manipulated. The extent to which this superiority can be exploited, however, depends at any given time on machine capacities and the availability of the requisite data. Within these limits, the machine-run iterations of input-output systems establish full cost coefficients and hence truer balances than are obtainable under material balancing which is confined in the main to the estimation of direct costs. Equally important, the use of time-saving computers permits the solution of not just one but several balanced plan variants from which the political leaders can choose their preferred version, thus moving the economy nearer its production frontier.

The ability of the leaders to identify "the best" of a variety of plans depends on the degree to which they understand the associated developmental strategies. As instrumental goods assume more prominence, it becomes increasingly necessary to probe the consequences of particular programs some distance into the future. In view of this, it is surprising to find the Soviets just now coming to grips with the needs for "continuous planning" and more precise specification of means-ends relationships.

While an advocate of I-O, Levine is careful not to represent it as a panacea for the many difficulties that beset Soviet planners and the fact that it entails new and considerable problems is explicitly acknowledged. On the other hand, the defects of input-output, long noted in the West, do not propel him into a hasty embrace of some of its conceptually more refined programming relatives. This, I think, is commendable. Attempts at optimizing on too grand a scale may serve simply to forestall realizable patterns of suboptimization. Such cautions may be wasted on Soviet economists who appear unlikely to become infatuated with electronic utopias; Western observers, however, are more prone to romanticize economic rationality and the benefits which national markets offer Soviet planners.

This is not to assert that input-output systems constitute the proper methodological terminus for Soviet planning. On the contrary, I would agree with Professor Levine that linear programming also looms on the horizon along with other more realistic models which enable the systematic exercise of choice. Moreover, I would emphasize, as he does not, that these several approaches are not mutually exclusive, or at any rate, need not be. Thus, the usual I-O assumption of structural constancy may be variously abridged as the empirical basis for alternative production functions is established. The resulting "mixed" planning model might include various predetermined activities, with choice according to some specified criterion reserved for certain other sectors. The model solution also might be selectively refined on the basis of detailed investigations conducted outside it where the relevant feedback effects appear either insignificant or estimable. In sum, the completion of an economy-wide process model is not required in order for the highly disaggregated process analysis of particular sectors to be of use.

Soviet objections to input-output, like the Western critique, center on the postulated invariance of structural coefficients and constant returns to scale. Yet these transplanted criticisms may not be fully pertinent. Recall for example, the announced intention of the Soviets to construct alternative plans. This permits at least some variation in production functions as well as in the final bill of goods. In addition, it appears that the technology matrices may be constructed initially on a territorial basis. Hence, the resulting all-union coefficients should comprise some kind of weighted average which can be shifted experimentally with alternative regional distributions and product assortments. By disaggregating and providing for some substitutability Soviet planners may achieve acceptable approximations of the nonlinear world while retaining the computational advantages of linear functions. Likewise, the modification of the technology matrix on a fairly frequent basis to adjust for technical change should prove increasingly feasible as Gosplan's computers improve in size and number.

I am inclined to agree with Professor Levine that some mixture of total and final output targeting makes the best sense politically and economically for the Soviets, it being plain that the altered mathematics poses no difficulties. In many cases total outputs can be projected more accurately than the corresponding final demand components. It should also be noted that when I-O targets are phrased at least partially in terms of total outputs, not only may bottlenecks be rendered apparent, but the presence of surplus resources as well may be ascertained.

A troublesome point arises, however, in connection with the possible contradictions of plan balance and incentive targeting. I refer here to the optimal tautness concept which Professor Holland Hunter has advanced; namely, the deliberate unbalancing of plans either in the direction of soft or hard goals so as to coax or pressure the maximum product from the labor force. If the disparities are at all significant, it may be advisable to work with two plans: a carefully fitted internal forecast to assure requisite material supplies and an external admittedly unbalanced set of hortatory targets.

If I have any general criticism to make of Levine's stimulating essay, it is only that the historic "look" of Soviet planning receives relatively too much attention. The stage is well set but insufficient time is left to examine emerging and prospective input-output developments. Regrettably, also, current

Soviet efforts to improve their value and technical indicators and to launch other reforms prerequisite to successful input-output operations go virtually unnoticed.

ALEXANDER ERLICH: I find it difficult to disagree with major findings summarized in Professor Smolinski's perceptive paper, and I see no good reason for trying too hard. I shall therefore confine myself to elaborating, with a slightly different emphasis, several points made by him.

To begin with, I would tend to be more explicit (or, if you will, more obvious) than Smolinski in emphasizing the basic fact that Soviet and American economies at the beginning of the First Five Year Plan period were *not* operating on the same production function. In such a situation, given an infinitely elastic supply of capital, it is always possible for the more backward economy to move toward the higher capital-labor ratios as well as toward larger average size of the plant prevailing in the more advanced one all along the line, and to show increasing returns in process. Such a possibility, it goes without saying, would be bound to become a reality because the high rate of over-all growth would make individual industries and plants provide for each other, in Smolinski's words, "guaranteed, stable, and rapidly expanding markets." Furthermore, in the relatively backward economy adding rapidly to its productive capacity in process of catching up, the share of more up-to-date and larger equipment in the capital stock would after a while become higher than in the more advanced economy showing a lower rate of growth. Lastly, whenever the backward economy is centrally planned and the advanced one is not, it should not be surprising to see some of the "world's largest plants" in the first in view of the planners' ability to enforce a high degree of standardization and to reduce the frequency of changes in design (although the lowest cost per unit of output achieved as a result might be sometimes associated with lower quality of product). Yet even if the assumption of infinitely elastic capital supplies were true, our backward economy could not reach the production function of the advanced one by one jump. The main point is, of course, that the capital supply is far from infinitely elastic. Does this mean that everything we said a while ago would have to be thrown overboard and that we are sent reeling back to the opposite extreme of "pygmyism"? Not at all. In important sectors of the relatively backward country the advantages of more up-to-date technology would still remain overriding, particularly when the economy in question is oriented toward sustained rapid growth and when its "embodied" as well as "disembodied" technology happens to contain substantial elements of modernity; and these advantages would be more often than not linked with economies of scale. But I do not have to belabor this point, because the case for a selective interindustrial and intra-industrial mixture of "big" and "small," depending on the shapes of production functions in particular areas of the system, is effectively argued by Smolinski.

To be sure, all this is largely a difference in expositional matters. I would like now to touch upon a point in which there may be a minor disagreement in substance. Smolinski is profoundly right when he notes that extremely long gestation and warming-up periods of new plants were perhaps the most disturbing feature of giantism. He is equally right when he stresses that for these very reasons the policy of early giantism clashed with the objective to maximize growth in the immediate future. But Smolinski seems to concede too much when he goes on to argue that "looking upon from a long-run perspective of thirty years, even prewar giantism itself appears somewhat more defensible" because "some of the plants that had been total failures of the thirties perform excellently at present." The last quoted observation would refute those critics who denounced the early "giants" as merely "Egyptian pyramids." Yet a more serious criticism consists in pointing out that by diverting some of the resources from building of giant plants in steel industry, for instance, to less monumental projects, we could get increases of steel output at an earlier date, and these increases could be ploughed back into further increases of the steel producing potential. In some instances, to be sure, the advantages of the large-scale unit would be powerful enough to compensate what Maurice Dobb calls "compounding effect" of the investment in short processes; but in others they would not. (See the striking quotation from Kantorovich.) Obviously, as the scarcity relations of capital and labor would change and the shortage of steel would abate, the small and quick-yielding steel plants could be gradually replaced by larger ones. Hence not only the "high marginal rate of impatience" of Soviet planners but also the cause of long-term growth was ill-served by early giantism.

Turning to the motives behind the giantist policy, I strongly agree that the influence of Marxism is often exaggerated. Marx could be interpreted as saying, in effect, that the envelope curves would be shifting in southeastern direction to the extent that technological progress would entail a secular increase in the size of optimal plant. This is not the same thing as to press for choosing the largest plant size within the given envelope curve (or, for that matter, within an envelope curve toward which the industry in question was moving); but this was precisely what early giantists were doing. At this point a recent controversy among Western economists comes to mind. Several years ago Peter Wiles argued (in his *Price, Cost and Output*) that the conventional U-shaped cost curve had no equivalent in real life since the largest-size firms were uniformly showing the lowest unit cost. In one of his Columbia 1957 lectures, Abba P. Lerner retorted that this finding would not necessarily invalidate the concept. The above-optimum firms would not be there, not because they would be unconceivable, but because they would be eliminated in competitive struggle or (one might add) would perhaps not be built in the first place. In this sense I fully concur with Smolinski's concluding remarks; it does not seem too farfetched to say that early Soviet giantists put Western neoclassical economists in their debt by supplying them with a life-size example of the rising portion of the U-shaped curve.

To continue: I have no quarrel with the Eucken hypothesis nor with the point about propaganda value of the "biggest plants in the world." Two more guesses might be ventured, however. First of all, as Smolinski himself recognizes, not only planners at the top but also planners on intermediate levels have been pressuring for big projects. They may have felt that it should be easier to claim (and to obtain) appropriations of scarce supplies from the center when the enterprise in question accounts for a significant share of the output of the industry or of the region in which it is located. The second point is more tenuous. The First Five Year Plan anticipated a near trebling of the total industrial output and a development of a number of brand-new industries between 1928 and 1933. Could this task be achieved best by scattering the limited number of managers and skilled workers over a multitude of small plants or by concentrating them in a smaller number of large-size plants? It might be argued that it is easier to find appropriate managers for smaller plants than for very large ones. But the Soviet planners of the early thirties were probably less than fully aware of this point, and in view of stupendous magnitude of planned expansion and of the structural changes it entailed, it is not certain that a pattern involving the construction of a larger number of smaller plants would not lead to shortages also of lower level managerial skills. The awkward dilemma could be eased if the Soviet planners had agreed to scale down the rate of expansion. But this, as we know, they were not prepared to do.

I should like to conclude with two questions on Professor Granick's paper. His analysis of relative underutilization in Soviet metalworking industry and of the apparent nonrationality of massive investment in this field during the First Five Year Plan is most instructive. Yet, I wonder whether some of the considerations discussed in Smolinski's paper would not be relevant here: given the planners' ardent belief in spectacular cost economies to be gained in new up-to-date plants and the robust optimism regarding the gestation period, wasn't the decision to push the investment in such plants a fairly logical one? Granick notes that the utilization of greatly expanded metalworking industries remained comparatively low throughout the quinquennium. Wasn't this due largely to the fact that there was less steel to work with than had been expected, with the output of steel equalling 5.9 million tons by 1932 instead of 10 million called for by the Plan, and of 15-17 million envisaged by its revised version?

THE ECONOMICS OF RESEARCH AND DEVELOPMENT

DETERMINANTS OF INVENTIVE ACTIVITY*

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This paper is the latest in a series of papers growing out of a single research project. It can be best understood against the background of those which have preceded it.[1] The earlier papers have shown, contrary to common expectation, that taking one industry at a time, inventive activity pertaining to an industry's capital goods appears to follow rather than lead investment. Once this lead-lag relationship is taken into account, the evidence suggests that capital goods invention in a given industry varies directly with the volume of investment in that industry. This relationship seems to hold in both the long run and the short run.

The results just described raise but do not answer the question of whether industries with more investment also have more capital goods inventions. Conceivably, while inventive activity may rise and fall with the rise and fall of investment within a given industry, the trend levels about which the fluctuations occur may differ substantially between industries. This paper explores this problem.

Ideally for this purpose we would of course want data on investment in each industry, but unfortunately comparable investment data are unavailable for most of the industries for which data on inventive activity have been compiled. In the interest of maximum coverage, in place of investment we use data on value-added and changes in value-added in the industries using the capital goods to which the inventions apply.

Presumably gross investment in an industry is positively correlated with value-added and net investment with changes in value-added. However, since such correlations are necessarily imperfect within a given industry and since the capital-output ratio varies from industry

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[1] Cf. Jacob Schmookler, "Changes in Industry and in the State of Knowledge as Determinants of Inventive Activity," Proceedings of the Minnesota Conference on Inventive Activity held in May, 1960 (forthcoming); "Economic Sources of Inventive Activity," *J. of Econ. Hist.*, Spring, 1962; and "Invention, Innovation, and Investment," Jt. Econ. Com. (forthcoming).

to industry, one would not expect to find a high correlation between value-added and inventive activity across industries at a moment of time.

The likelihood of finding a high correlation is seemingly further reduced by the fact that the analysis completely ignores the three variables most often mentioned as determinants of inventive activity: size of firm, character of competition, and the state of the sciences underlying an industry's technology. In effect, what we test here therefore is the hypothesis that the industrial distribution of inventive activity relating to capital goods is determined primarily by the size of the industries concerned, and that other variables—market structure and state of knowledge—are usually second-order determinants. Moreover, by considering lead-lag relationships, our analysis throws added light on an important issue raised in the earlier papers; i.e., on the question of whether inventive activity is mainly an exogenous or endogenous variable.

Before presenting our results, however, it is useful to explore briefly the four principal size-related variables which provide logical support for our hypothesis. Presumably the same variables which explain interindustry differences in inventive activity at a moment of time, perhaps in a somewhat different guise, also explain intraindustry differences in inventive activity over time.

These size-related variables are the industrial distribution of the following: (1) the funds available for the support of inventive activity, (2) the number of creative individuals, (3) the kinds of stimuli which tend to induce inventive responses, and (4) the incentives for traditional economic maximizing behavior in the context of inventive activity.

The association of size with the first two of these is obvious and they can be disposed of quickly. Men invent in the fields they are familiar with, and they are most familiar with the goods they produce and consume. On the assumption that creative men, whether production workers, supervisors, salesmen, users, etc., tend to be randomly distributed among such occupations generally, then the presumptive association between field of invention and degree of familiarity suggests that one would find a positive association between the industrial distribution of the labor force and consumers on the one hand and the industrial distribution of inventive activity on the other. (This expectation, however, is qualified by the additional expectation that creative individuals are likely to flock to newer and therefore more interesting fields.) And, of course, such money as may be needed to finance inventive activity is likely to be more readily available for projects which the supplier of funds can understand. This in turn tends to link the distribution of inventive activity to the industrial distribution of income; i.e., to the distribution of industries by size. The point has equal validity whether the inventor is self-financing or derives his support from other investors.

Stimuli which tend to induce creative responses, we conjecture, are positively correlated with the absolute magnitude of change in a field. However, the absolute size of change in any field is generally positively correlated with the size of the field itself. The general point may be illustrated by the fact that expanding output usually signifies the presence of new production workers, supervisors, salesmen, and users. If these "new" men have as much creative ability and as good a general background of knowledge as has the average person already in the field, then because the former see the product or process with fresh eyes they are probably more likely to invent than those long-established in the field. Expanding output is also likely to be associated with new uses of the product by old users, a circumstance which may prompt them or those who sell to them to contrive inventive adaptations in the product to make it more effective in its new uses. Similarly, an unexpected, large rise in output may cause the capital-output ratio to fall to uncomfortably low levels and stimulate supervisors or production workers to devise improvements in plant and equipment to relieve conditions.

The first two factors noted above are based on the assumption that men who engage in or finance inventive activity tend to choose fields with which they are familiar. The third assumes that a fresh viewpoint and events which "make the familiar strange"[2] predispose men toward inventive activity. One would expect such determinants to be relatively more important among *ad hoc*, amateur inventors than among professionals, although they would not be without influence among the latter.

Whereas these three factors are all based, in one way or another, on the presumptive consequences of differential familiarity with different branches of technology, it is interesting that under plausible assumptions maximizing behavior will also tend to distribute inventive activity among industries according to their size even if we assume uniformity of familiarity of inventors with all fields.

Assume that those who employ resources to try to discover new methods of doing things allocate these resources in ways such that (1) the expected utility of the return to a given amount of such resources is maximized and (2) the marginal expected utility of return to inventive activity is equal to that of returns to resources employed in other pursuits.

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[2] The phrase is William J. J. Gordon's. Cf. his *Synectics* (Harper, 1961), pp. 33-37.

The first condition is fulfilled when an independent inventor or the person in charge of allocating a given research and development budget apportions his resources among the various lines of activity so that the expected marginal utility from probing in any area is the same as that in any other one.[3] The second condition is met when the expected marginal utility of investment in inventive activity is the same as that in other lines of investment. Although the first condition is fulfilled when the second one is met, we state the over-all condition in two parts in order that we may say something about the distribution of inventive activity, even though the total amount may not be optimal.

Although such a formulation also might permit one to include prestige, fashion, and other nonmonetary factors as determinants of inventive activity, we do not use it for this purpose. The ordering of possibilities according to expected utility is employed in order that risk might be included as a determinant of the allocation. Assume, for example, that the utility of the individual (an independent inventor or a director of research and development) is a quadratic function of the difference between his discounted future proceeds from inventive activity during a particular period and hi-outlays during that period; i.e., $\mu = \alpha(R-C)+\beta(R-C)^2+\gamma$, where R is the discounted return, C is the outlay and $\alpha(>0)$, $\beta(<0)$, and γ are parameters of his utility function. Let

$$R = \sum_{i=1}^{n} R_i \quad \text{and} \quad C = \sum_{i=1}^{n} C_i,$$

there being n kinds of inventive activities, R_i and C_i being the return and costs, respectively, from the i^{th} kind. (R_i could be the sale price of the invention relevant to the i^{th} industry—possibly not yet in existence—for example.) Further, let there be a budget for amounts spent on inventive activity, i.e.,

$$\sum_{i=1}^{n} C_i = K.$$

R_i is assumed to be a stochastic variable with an expected value $E(R_i)$ and variance $\sigma_{ii} < \infty$. R_i may not be independent of R_j in which case the covariance $\sigma_{ij} \neq 0$.

If the individual maximizes expected utility, $E(u)$, he will choose C_i, the amount of his resources (measured in some numeraire) to be spent on inventive activity i, in a way such that:

$$\frac{\partial u^*}{\partial C_i} = \frac{\partial E(u)}{\partial\, C_i} - \lambda \begin{matrix} < \\ = \end{matrix} \Big\} 0 \qquad \begin{matrix} \text{for } C_i = 0 \\ \text{for } C_i \geqq 0 \end{matrix}$$

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[3] The condition of equality holds only when some of each activity is engaged in. Otherwise, the optimizing condition should be stated as one such that any line operated at zero level has a lower expected utility than that of any line operated at a positive level.

$u^* = E(u) - \lambda(\sum C_i - K)$, λ being a Lagrangean multiplier. Assume that $C_i > 0$ for all i, and

$$-\left|\frac{\alpha}{2\beta}\right| > \text{K},$$

so that the second order conditions for a maximum of u^* are fulfilled. Then the optimal vector, C, call it

$$\hat{C} = \begin{bmatrix} \hat{C}_1 \\ \hat{C}_2 \\ \cdot \\ \cdot \\ \hat{C}_n \end{bmatrix} = \left(\frac{\alpha}{2\beta} + K\right)(AA' + \sum - eA')^{-1}(e - A)$$

where A is the column vector,

$$\begin{bmatrix} E(R_1) \\ E(R_2) \\ \cdot \\ \cdot \\ E(R_n) \end{bmatrix} = \begin{bmatrix} A_1 \\ A_2 \\ \\ \\ A_n \end{bmatrix}$$

$\sum$ is the square matrix,

$$\begin{bmatrix} \sigma_{11} & \sigma_{12} \cdots \sigma_{1n} \\ \sigma_{21} & \sigma_{22} \cdots\cdot \\ \sigma_{n1} & \sigma_{n2} \cdots \sigma_{nn} \end{bmatrix},$$

and e is an $nx1$ vector of ones,

$$\begin{bmatrix} 1 \\ 1 \\ \cdot \\ \cdot \\ \cdot \\ 1 \end{bmatrix}$$

Obviously $\left(\frac{\alpha}{2\beta} + K\right)$ does not enter the ratio $\frac{\hat{C}_1}{\hat{C}_j}$, i.e., the ratios of the optimal values depend only upon the joint probability distribution of returns and not upon the parameters of the utility function, nor upon the budget constraint. Thus, if each "inventor" had a quadratic utility function and any viewed the probability distribution as the same as any other,

$$\frac{\hat{C}_{ir}}{\hat{C}_{jr}} = \frac{\hat{C}_{is}}{\hat{C}_{js}}, \qquad \hat{C}_{ik} \text{ and } \hat{C}_{jk}$$

representing the optimal values for the i^{th} and j^{th} levels of inventive activity for the k^{th} "inventor."

Let $(AA'+\sum-eA')^{-1}=\Omega$. Then

$$\frac{\hat{C}_i = \sum_{k=1}^{n} \omega_{ik}(1 - A_k)}{\hat{C}_j = \sum_{k=1}^{n} \omega_{jk}(1 - R_k)},$$

where ω_{ik} is the k^{th} element of the i^{th} row of Ω. The above ratio is such that $\frac{\hat{C}_i}{\hat{C}_j}>1$, if $\sigma_{ii}=\sigma_{jj}$ and $A_i>A_j$, or if $A_i=A_j$ and $\sigma_{ii}<\sigma_{jj}$. In fact, if $\sigma_{ij}=0$, $\frac{\hat{C}_i}{\hat{C}_j}$ is approximately $\frac{\sigma_{jj}}{\sigma_{ii}}\frac{(A_i-1)}{(A_j-1)}\cdot$ Thus, for example, if an increase in the mean of the i^{th} distribution were accompanied by not more than a proportional increase in the variance of that distribution, the j^{th} distribution remaining unchanged, $\frac{\hat{C}_i}{\hat{C}_j}$ would increase. In fact there is a relationship between A_i and σ_{ii} such that if such a relationship existed in nature

$$\frac{d\left(\frac{\hat{C}_i}{\hat{C}_j}\right)}{dA_i}$$

would be a constant, if $\hat{C}_j$ and σ_{jj} are constant. We wish to assert, however, only that inventive activity in industry i will exceed that in industry j if

$$\frac{\sigma_{jj}}{\sigma_{ii}}\frac{(A_i-1)}{(A_j-1)}>1.$$

Such an assertion would not be unreasonable if the probability that one would invent a method that would reduce the processing cost of commodity i by, say, x per cent was the same as that of discovering a method of reducing the cost of processing commodity j by x per cent. Then the expected value of an invention applicable to commodity i would exceed the expected value of an invention applicable to commodity j if the value-added in industry i exceeds that in industry j. Inventions are sought for according to their applicability to the structure of industry in the future, in which case trends in value-added as well as current values ought to be included.

These four factors—the industrial distribution of funds, of creative individuals, of creative response-inducing stimuli, and of prospective returns—are thus all likely to be positively correlated with the size of the industry.[4] However, as noted previously, the prospects of a high correlation are a priori not very good, in part because we are forced to compare capital goods inventions with value-added rather than with investment, and in part because the analysis takes account neither of market structure nor the state of knowledge. The prospects are further diminished by the index of inventive activity employed, statistics of patents granted. These data, whose deficiencies have been discussed by one of us and by others elsewhere, are nonetheless the best available for our purpose. When they are used in interindustry comparisons, we implicitly treat them as though they were equally representative of inventive activity in each industry. However, significant but unknown differences may exist in the proportion of inventions patented in different industries. This difficulty is increased by the manner in which these data were compiled. Specifically, the patent statistics classified by industry were prepared by assigning to specific industries individual subclasses among the Patent Office's array of about fifty thousand subclasses. A subclass was assigned to an industry when at least two-thirds of the patents in it appeared to belong to the industry. However, since the Patent Office classification system is primarily functional, not industrial, the proportion of patents covered by our data may differ significantly from industry to industry. Because determining the appropriate correction factor for the data would be very costly, we decided to attempt the comparisons reported here with full recognition of the hazards and little hope that the results would prove as positive as they turned out to be.

Data for value-added were compiled wherever possible for industries for which patent statistics on capital goods had been assembled previously and independently of this experiment. In all, eighteen industries were included, with a maximum of sixteen and a minium of seven for any year. The value-added data were deflated by the BLS index of wholesale prices to make the regression coefficients comparable between years. Three-year totals of patents centered on the given year were used to offset the high variability associated with small numbers.

The principal results can be quickly summarized: the coefficients of correlation were, to us, surprisingly high; the regression coefficients were invariably positive; and most important the correlation coefficients were generally higher with patents lagged than with patents unlagged.[5] For example, the coefficients of correlation for value-added and patents lagged three years were higher than those derived using patents unlagged on twelve occasions out of thirteen. While the differences are seldom significant according to conventional tests, the uniformity of the relationship is suggestive. Moreover, there exists a tendency for the coefficients of correlation to rise as the lag is increased from zero to one, two, and three years. (We have not considered lags greater than three years.) This pattern is presumably the joint product of two typical phenomena: investment in a given industry tends to lag behind changes in output and inventive activity as reflected in patent applications in a given industry tends to lag behind investment in that industry.

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[4] Discriminating among these causal factors will require different techniques and perhaps different data from those used here.

TABLE 1

COEFFICIENTS OF DETERMINATION—CAPITAL GOODS PATENTS AND VALUE-ADDED IN SELECTED INDUSTRIES

Year	Patents and Value-Added (r^2) (1)	N (2)
1899 & 1904	.62	14
1909 & 1914	.21	18
1919	.25	10
1921	.34	10
1923	.39	11
1925	.39	11
1927	.29	13
1929	.66	12
1931	.39	14
1933	.58	14
1935	.66	14
1937	.73	16
1939	.77	15
1947*	.84	13

* Dependent variable is patents lagged two years. Data for patents lagged three years are not available.

The coefficients of determination between value-added and patents lagged three years are presented in column (1), Table 1. The table shows that the coefficient of determination generally rose during this century for the industries studied. Speculations as to the causes for the rise are probably premature, although one is tempted to suggest that it reflects the increased commercialization of invention with a consequent increase in the significance of maximizing behavior, which is probably more tightly linked to size than are the other variables. Be that as it may, the coefficients are significant at the 5 per cent level for the first entry in the table and for all the years beginning with 1929.

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[5] We also correlated patents with value of shipments. The resulting coefficients of correlation were lower than those for patents correlated with value-added in twelve years out of thirteen. However, the differences were usually not statistically significant.

We also ran simple correlations between the annual rate of change in value-added and patents lagged three years. On five out of thirteen occasions these correlation coefficients were higher than those between value-added and patents. Although the differences were not statistically significant, a multiple-correlation analysis seemed indicated, using both value-added and annual changes in value-added as independent variables. Until 1929, however, the multiple correlations improved little over the simple correlations. The values for R^2 are shown in column (4) of Table 2.[6]

TABLE 2

COEFFICIENTS OF DETERMINATION—CAPITAL GOODS PATENTS, VALUE-ADDED AND CHANGES IN VALUE-ADDED IN SELECTED INDUSTRIES

Year	Constant (1)	Coefficient of Value-Added (2)	Coefficient of Annual Rate of Change in Value-Added (3)	R^2 (4)	N (5)
1909 & 1914	−11.4*	1.15	26.2*	.71	15
1919	173.1*	1.84*	−0.36*	.81	9
1921	253.1*	0.82*	6.23*	.81	9
1923	184.3*	2.14	−4.41*	.85	9
1925	170.3*	1.58	3.03*	.76	10
1927	193.3*	1.57	−4.58*	.71	10
1929	64.3*	1.60	2.11*	.88	12
1931	88.6*	0.67	−7.96*	.81	12
1933	36.2*	1.56	4.40*	.84	14
1935	−13.4*	1.81	2.40*	.84	14
1937	−71.8*	1.06	10.92	.89	12
1939	−14.7*	0.86	1.51*	.80	16
1947†	−39.9*	1.01	−6.83	.94	13

* Not significant at the 5 per cent level.

† Dependent variable is patents lagged two years. Data for patents lagged three years are not available.

NOTE: R^2 is not corrected for degrees of freedom, which are two less than N.

In one sense, though its existence has not been suggested before so far as we are aware, a positive association between industry size and inventive activity is not startling. Perhaps then the most significant aspect of the research is the support which it lends to the use of patent statistics as an index of inventive activity. On the other hand, if the apparent association between invention and size is genuine, then the

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[6] The interesting instances of negative coefficients attached to the annual rates of change in value-added, as shown in column (3) of Table 2, were found too late to be considered in the analysis presented here. That these coefficients are negative in 1919 and 1947, both high-volume postwar years, is reminiscent of a similar tendency, noted in the earlier papers cited above, for the usual positive correlation between output and invention to break down toward the peak of a boom. As suggested in the earlier papers this reversal may be associated with a decrease both in the incentive to innovate and in the availability of the slack resources needed for inventive and innovative activity.

TABLE 3
VALUE-ADDED IN SELECTED INDUSTRIES
(1926 Millions of Dollars)

Year	Flat Glass*	All Other Glass	Seamless Hosiery	All Other Knitting	Envelopes	Paper Bags	Paper Boxes	All Other Paper	Pulping	Sugar Refining	Petroleum Refining	Hats	Cooperage	Pottery, etc.	Shoes	Tobacco	Glass	Knitting
1899					5.0		29.9	29.5			40.4		31.2		173.0		91.9	
1904					7.2		33.8	36.2			59.6		30.7		206.0		108.9	
1909					8.7		42.5	49.7		77.7	55.8		25.9		244.1		108.6	
1914					12.2		56.4	57.5		76.7	104.4		25.1	36.6	280.5	298.1	133.0	
1919					12.8		76.0	62.0		104.3	277.7		21.4	39.0	317.5	233.3	139.6	
1921					20.4		88.1	77.3		64.8	353.5		16.5	60.5	398.6	189.1	148.6	
1923					23.1		119.4	100.6		97.5	366.8		24.7	80.3	470.2	218.0	221.2	341.0
1925					23.0		125.8	103.5		100.3	470.5		22.8	74.6	429.0	309.2	204.6	328.5
1927					28.3		144.8	130.6	70.1	77.6	408.8	197.9	24.2	80.7	471.7	384.6	210.5	399.4
1929					32.9		141.0	158.5	94.6	118.3	638.0	186.5	24.5	87.7	473.2		245.6	451.2
1931					33.6	28.6	143.3	136.8	76.6	118.8	430.1	166.3	20.3	67.8	432.9	507.3	222.1	359.9
1933					27.3	30.5	146.7	123.4	80.1	171.6	476.5	118.2	19.3	47.8	405.2	379.4	217.5	377.8
1935					28.4	29.6	162.1	132.8	88.8	91.3	440.0	118.9	20.8	61.0	387.5	355.5	266.8	365.0
1937	150.9	264.5	70.3	317.9	30.4	33.6	189.3	185.6	108.3	125.7	558.5	115.6	20.5	79.4	407.2	376.7		
1939	119.3	276.8	93.5	369.5	33.1	41.2	219.1	213.1	106.6	151.0	686.1	141.1	18.0		448.8	454.2		
1947	190.0	218.5	107.8	451.0	44.9	78.3	416.1	414.3	273.4	153.7	982.2	137.7	20.6					

* Flat Glass consists of Flat Glass and Products of Purchased Glass.

SOURCE: Data derived from *Census of Manufacturers* were deflated by the BLS index of wholesale prices.

TABLE 4

UNITED STATES PATENTS GRANTED ON CAPITAL GOODS INVENTIONS IN SELECTED INDUSTRIES, THREE-YEAR TOTALS

Three-Year Total Centered on Year	Flat Glass	All Other Glass	Seamless Hosiery	All Other Knitting	Envelopes	Paper Bags	Paper Boxes	All Other Paper	Pulping	Sugar Refining	Petroleum Refining	Hats	Cooperage	Pottery, etc.	Shoes	Tobacco	Glass	Knitting
1902					23		112	406			83		54		389	145	339	
1907					25		114	304			59		36		568	154	356	
1912					40		176	344		94	145		29		1065	85	232	
1917					38		123	332		61	427		13	417	790	92	344	
1922					39		177	536		78	733		34	624	696	96	558	
1924					38		182	566		105	788		21	661	665	112	832	
1926					43		171	684		124	1059		19	681	835	92	663	356
1928					37		179	858		91	1166		16	585	861	127	781	484
1930					40		199	826	264	64	1273	69	15	470	786	175	1106	518
1932					47		170	652	208	50	1260	41	10	363	842	192	840	419
1934					28	74	163	557	183	52	1090	38	10	225	944	98	613	468
1936					27	70	188	530	125	80	914	42	8	275	830	128	471	556
1938					21	75	181	448	71	88	1030	36	7	279	836	180	593	478
1940	50	524	67	462	20	63	161	387	51	92	1237	24	1	300	719	157		
1942	32	359	56	293	10	35	121	263	37	68	867	10	1	245	472	107		
1949	24	302	45	376	15	27	146	350	85	67	663	18	2					

NOTE 1: Only data used in the correlation analyses are presented here. Thus, the data for 1902 in this table were correlated with those in Table 2 for 1899; those for 1907 in this table, with those in Table 3 for 1904, etc.

NOTE 2: Patents were counted as of the date of application except for the glass fields, shoes, and tobacco. The latter were counted as of the date of granting. For the latter industries, in order to make the patent data more comparable with those for other fields, patents granted prior to 1918 are set to correspond to those applied for one year earlier, patents granted from 1918 to 1941 inclusive are set to correspond to those applied for two years earlier, and those granted beginning in 1942 are set to correspond to those applied for three years earlier. The necessity for this adjustment arises from increases in the average lag between application and grant.

influence of size of firm, character of competition, and state of knowledge is correspondingly small. Perhaps the yield from inventive effort varies greatly depending on the location of that effort along the technological frontier. Perhaps, too, when standardized for size of industry, differences in size of firm and character of competition will prove to be important variables. Yet it would seem the case that the more potent such influences are, the smaller should be the effect of size of industry alone.

Finally, if our results are accepted, then the theory that interindustry differences in rates of growth are primarily the result of antecedent differences in rates of progress in technical knowledge may be seriously misleading. The evidence presented here suggests that the reverse may be true; i.e., that progress in technical knowledge in an industry can be an effect as well as a cause of the rate of industrial growth.

RESEARCH AND DEVELOPMENT, NEW PRODUCTS, AND PRODUCTIVITY CHANGE

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My original intention for this paper was to see what relationship could be discovered across industries between research and development personnel as a percentage of total man-hours worked to produc- methods recently used by Solow and Massell. Considering two previous efforts in this area has led me to suspect that there are systematic biases involved in the procedures which make it unlikely that we can obtain reliable results at this stage of our knowledge.

I

The two previous efforts are complementary. The first, by Nestor Terleckyj, examines the factors affecting productivity advance in two-digit manufacturing industries, using the productivity data prepared by John Kendrick. Using multiple-regression techniques, Terleckyj finds that for two-digit industries, the relationship of research and development personnel as a percentage of total man-hours worked to productivity change is "much more clearly pronounced over the long period 1919-1953 than for shorter periods" [14, page 71]. For shorter periods, the relationship is positive although not significant at the 5 per cent level (except for 1919-29). He suggests that other factors not taken into account in the analysis (as well as errors of measurement) may have been more influential in the short run [14, page 88]. After eliminating growth of output from his analysis, he notes that "research intensity and cyclical amplitude account for about 55% of the inter-industry variation in the rate of productivity change over the relatively long period 1919-1953. Of the two variables, research intensity is clearly the more important one."[1]

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[1] A defect of Terleckyj's work is that the data on research and development are collected on a company basis, whereas productivity figures are collected on an establishment basis, although for the earlier years the compilers of the data Terleckyj uses adjusted for the more obvious defects. Consequently, amounts of research money and personnel are attributed to industries with which they have no relationship. A proper accounting which allocated funds or personnel to their appropriate industries might affect the correlation between research and development expenditures and productivity change. (Given current data, a reaccounting in more than an extremely rough way would be impossible, however.) The data are suspect in other ways as well: for the long-period correlation, they are derived from the National Research Council directory of research laboratories. Recent editions of the directory explicitly caution against constructing estimates from information

The second study is by Jora Minasian, of the RAND Corporation. Minasian's is a cross-section study of a non-random sample of eighteen firms in the chemicals and allied products industry for 1947 through 1957. He derives productivity change from a Cobb-Douglas equation in which changes in outputs not ascribable to increases in inputs appear in a productivity index, from which he derives an average annual rate of growth in productivity for each firm. He relates the rate of change in productivity to research and development expenditures (deflated by size variables for the firms), investment in plant and equipment, economies of scale, and monopoly pricing. As he summarizes the study: "The relevant research and development expenditure was found to be a highly significant independent variable explaining not only the rate of growth in productivity, but also the trend of the profitability of 18 chemical firms in the sample" [12, page 67]. And further: "We can conclude from this study beyond reasonable doubt, that causality runs from research and development to productivity, and finally to profitability" [12, page 3].

II

My feeling is that these studies have not really established what they set out to. Both authors see the research efforts of firms as primarily oriented towards increasing productivity. Terleckyj says:

> Research activity represents the directed effort—or at least a substantial part of this effort—to expand the range of technological possibilities. Research and development also help to ascertain the feasibility of prospective innovations and to plan the adoption of new technology. Consequently, the industries with a relatively greater research effort may be expected to experience a more rapid advance in productivity than industries with little research [14, pages 19-20].

Minasian says, in a similar vein:

> . . . the research and development program of a firm reflects the effort or costs of the firm in the direction of obtaining efficiency. Logically, therefore, one would expect that the change in productivity of the firm be somehow related to its research and development activities. Consequently, we propose the general hypothesis that: *The greater the research and development expenditures, the greater is the subsequent growth of the productivity of a firm* [12, page 10, his italics].

This emphasis seems somewhat surprising, since to me research and development effort suggests new product development rather more than it does cost improvement. If a large portion of research and development effort is devoted to new product development, then the connection between research and development expenditures and technological change no longer appears to be quite so much a matter of logic or causality.

Fortunately we are not left entirely in the dark in the matter. In

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in the directories. Checks on estimates for the thirties derived from directory data indicate an over-all understatement of about 25 per cent, with considerable variation by industry in the amount of the underestimate.

recent McGraw-Hill surveys on plant and equipment expenditures, questions have been included on the relationship of new product development to research and development expenditures. The McGraw-Hill sample was asked: "In determining your R & D expenditures, [what] do you relate these expenditures to?" For all manufacturing, firms (which were evidently restricted to a single answer) replied in the following proportions [11]: plans for new products, 48 per cent; sales, 26 per cent; profits, 13 per cent; capital investment, 2 per cent; and other, 11 per cent. On an earlier survey firms were asked: "What will be the main purpose of your research program?" The answers were: new products, 48 per cent; new processes, 11 per cent; improve present products, 41 per cent [10].[3] Survey data of this sort leave something to be desired, of course, but the results seem to point clearly to the fact that new products form a substantial motivation for research and development programs. The conclusion might gain something in strength when we observe (as McGraw-Hill carefully points out) that the sample includes mostly large firms. In industries where entering firms are small, highly research-intensive operations built around a single new product, as in the case of electronics, underrepresentation of small firms may understate the extent to which research and development and new products are connected.

Pondering the relationship of research and development expenditures to new products has led me to suspect two particular sorts of trouble with the kind of empirical work described. One trouble has to do with the price and output indices involved, which tend to obscure the relationship between research and development expenditures and productivity change. The other trouble has to do with the cost behavior of new products and its relationship to our measures of productivity change. Let me deal with them in order.

III

Our knowedge of new products is skimpy, perhaps because they are difficult to handle, both theoretically and statistically, given conventional tools of analysis. Such knowledge as we do have, however, leads me to believe that new products are frequently introduced at prices which are high in relation to levels at which they end up.

Discussion by business economists indicates two sorts of pricing policies on new products: "skimming prices" and "penetration prices." As Jules Backman describes these two policies, "penetration pricing is designed to encourage large volume by reaching wide markets quickly. It emphasizes low profit per unit" [5, page 46]. On the other hand, the skimming price is designed, as the name suggests, to start with a high price and gradually work down as the characteristics of the market become clearer. But in the case of penetration pricing as well, one would expect the initial price to be higher than the long-run price in many cases for safety's sake, since prices are easier to lower than to raise.

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[3] Jacob Schmookler points out to me that Bloom found much the same in his survey of fifty industrial concerns published in 1951. Bloom notes that "cost reduction ranged from 2 per cent to a high of 50 per cent, as a percentage of research budgets, with a modal allocation of 25 per cent for cost reduction and 75 per cent for product development and improvement" [6, page 607].

The tendency of new-product prices to decline with time becomes more important when we realize that one of the principal deficiencies of price indices is that they underrepresent new products. The recent report of the Price Statistics Review Committee of the National Bureau devotes a sizable section to the problem. The report notes:

> Although in principle the treatment of new products may err in either direction, we believe that in practice the problem is decisively that of introducing new products too late and retaining old products too long. . . . Our observations suggest that in many cases the need to introduce a new variety of a commodity is felt only when it becomes impossible to price the old variety because it has disappeared from many outlets [13, page 38].

Although the examples the Committee cites involve the consumer price index, it regards the problem as one common to the wholesale price index as well.

In view of the tendency for the prices of new products to fall over time relative to those of other products, the Committee concludes that "an index that overrepresents new products will tend to be biased downward and an index that underrepresents them will tend to be biased upward." Deflating a value series by an upward-biased price index will then tend to bias the resulting output series downward. If new product introduction tends to be correlated with research and development expenditures, then smaller "productivity increases" than actually occur will result for industries with high research and development input and substantial new product introduction.

The point affects the Minasian and Terleckyj papers in slightly different ways. Minasian takes figures for value of output for each firm and deflates them by price indices which he has compiled by reweighting components of the Bureau of Labor Statistics wholesale price index for chemicals and allied products. Consequently, if the components of the index differ in the extent to which they underrepresent new products, which seems like a reasonable proposition, then the price indices which he constructs for individual firms are likely to result in an understatement of productivity change by an amount which is related to research and development.

The Terleckyj study poses a slightly different problem: it uses Kendrick's data, which are derived only in part from deflated value data. Most reliance is placed on Fabricant's output indices, supplemented for later years by those of the Census [see 9, Appendix D]. The output indices are subject to the reverse defect from the price indices, although the results on productivity estimates are the same. Output indices will fail to pick up new products until fairly late in their life cycle. But if new products tend to have more rapid rates of growth than old products, then an output index which fails to reflect the new products during their rapid growth phase will tend to understate the rate of growth in productivity.[3]

Even if the indices are perfect, however, there is another problem, one which Minasian raises: what one is measuring may well be changing monopoly power rather than changing productivity. He tries to test for this point, but with inconclusive results: "We did not find conclusive evidence to dispute the hypothesis that differential behavior of monopoly power among firms over time may have affected our productivity measure" [12, page 68]. (Let me note here in reference to Minasian's claims, quoted earlier, that I find this point grounds for "reasonable doubt" about his conclusions.)

The trouble here is this, which Minasian does not seem to recognize: if the introduction of new products is fairly closely related to research and development expenditures, as it may well be, in view of the McGraw-Hill findings presented earlier, then research and development expenditures can be closely correlated with "productivity change," although none of the spurious change in productivity is attributable to lower costs due to research and development on cost-reducing improvements.[4] "Skimming prices," high to start with and then progressively lowered, seem likely to be the rule on new products resulting from research and development expenditure. Backman notes that skimming prices will tend to be used "when a product has distinction or uniqueness and/or entry by competitors is blocked by patents" [5, page 46]. Falling prices on these products with a temporary and declining monopoly position will lead to an appearance of productivity change where there may be none. I do not see why this criticism should not apply to Terleckyj's study as well as to Minasian's. Indeed, it is possible that changes in the industries in which new products are important might account for some of the short-run variability in industry productivity rankings which Kendrick finds [9, pages 143-44].

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[3] The physical volume indices are adjusted for changes in coverage, but in a manner which is subject to the earlier criticism: the adjustment procedure assumes that "the price movements of total industry output parallel the price movements of the covered primary output" [9, page 420].

[4] These remarks can scarcely do justice to Minasian's discussion of this point, which is almost as long as the present paper. My point is simply that his entire discussion treats monopoly price changes as "idiosyncracies" [12, page 60] rather than as possibly related in a systematic way to research and development.

It would be pleasant if we could be sure that the effect on productivity estimates resulting from monopoly power would precisely cancel the effect of underrepresentation of new products in the indices, but I see no reason to suppose that this is so.

IV

Now that we have looked at the basis of the productivity figures and found things rather messy, let us look at a further implication of the relationship between research and development expenditures and new product introduction, this time on the cost side, assuming for the moment that all complications of measurement referred to above no longer exist.

Conventional economic theory pays little attention to the cost of new products. Cost is usually related to the rate of output per unit of time. This relationship forms the background to most discussions of productivity change. Yet there is another way of looking at the matter for new products: cost can be considered as a function of the cumulative number of units produced. The concept employed is the "learning curve" or "progress curve." Studies have shown that costs on some sorts of new products tend to decline with cumulative output [4, 8]. Armen Alchian in a recent paper has proposed that the phenomenon is sufficiently important to be explicitly included in our theory of costs [2, pages 35-36]. Although most of the empirical work has been done in the airframe industry, there is a considerably broader field of application for this sort of work. Andress suggests home appliances, electronics, residential home construction, shipbuilding, and machine shops [3, pages 95-96]. Asher is even more sanguine about the range of possible applications [4, page 6].

The problem which is raised for us is this: if higher levels of research and development among firms or industries lead to new products, and associated with new product introduction is the "learning curve" phenomenon, leading to fairly rapid declines in cost for new products, then what we are measuring is indeed productivity change, but to attribute the productivity change to research and development is a mistake, except insofar as further development expenditure after the product has been introduced contributes to the cost reduction. The bulk of the research and development expenditure on a new product is not related to the declining cost in a causative fashion, but only accidentally.

Clearly this is not the whole story. Some research and development is designed to contribute to cost reduction and presumably does so. My argument is that a large portion of research and development expenditure (and a portion which varies industry by industry) is devoted to the development of new products whose costs then decline for reasons not related to the research and development. We need to know more about the magnitude and timing of the cost declines which do occur before we can assess fully the impact of this point.

Thus far we have implicitly viewed the process as though a single new product were introduced and then productivity change showed up—in a fashion not causally related to research and development—because of the learning curve phenomenon. But if new product introduction is a continuing process, then an accelerating stream of new product introductions might well result in a decline in productivity for the firm or industry as a whole, even though productivity were increasing for each individual product, since the output of the firm or industry might become sufficiently heavily weighted with products which were new and relatively high cost, since they would be early in their life cycle. Clearly it is difficult to guess at these matters without some sort of explicit dynamic model.

V

This discussion has left untouched one important aspect of research and development and its bearing on productivity measures: quality change, a problem which is difficult to separate from new product introduction (on the output side, at least). Since my ignorance is comprehensive in this area, and the expert is present, let me just suggest a couple of thoughts. Research and development expenditure may well be related to change in quality of inputs. Research-and-development-intensive industries (or firms) might well be upgrading their labor force at a more rapid rate than other industries (or firms), for obvious reasons. If we do not take explicit account of this shift to a higher quality labor force, then we are dumping more into the mysterious basket marked "productivity change" than ought to be there, and, in the context of the kind of analysis that we are discussing, we will be attributing this "productivity change" to research and development without justification. (For a discussion of how serious the defects in input measurement can be, see [7].)

On the output side, there may also be serious problems. Adelman and Griliches [1] have recently indicated that much of the increase in price indices in recent years may be attributable to quality change. In this case, if the productivity analysis uses deflated value series, then the growth in output (and hence in productivity) will be understated. If quality change is related to research and development, which does not seem like an unreasonable proposition, then the relationship of research and development expenditure to productivity change will also be understated.

VI

In summary, I find that work which has been done to relate research and development to productivity change has suffered from what seems to me to be a misdirection from the outset, in that it has conceived of research and development as mainly directed toward cost improvement. It might be a better first approximation to say that for many industries research and development is directed at the establishment of temporary monopoly power through the introduction of new products.

Let me note in closing that my viewpoint, even if it turns out to be valid, has nothing to do with the relationship of productivity change in the economy at large with research and development in the economy at large. One industry's (or firm's) new product is frequently another industry's (or firm's) cost-reducing improvement. In many industries, significant improvements in productivity come about through the research and development efforts of suppliers and customers of the industry rather than through the efforts of the industry itself. (Bloom has some discussion of this point [6, page 606].) One could even conceive of a situation in which each industry's research and development did nothing to change its own productivity, but produced its impact entirely in other sectors, so that research and development expenditure would show no correlation with productivity change in the small, but would have a substantial impact on the economy as a whole.[5]

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[5] Since this paper was presented, Terleckyj has written to me as follows: "Productivity change is change in the ratio of the output index to the input index, where both indices are adjusted for change in mix, and particularly, new products are included in output. . . . New products, by hypothesis, have on the average and for relevant periods, a higher ratio of output to input than the older products of the same industry. Thus I see no reason for not expecting a positive and causal correlation between research and productivity change." In the absence of concrete evidence and given plausible arguments which can be made to the contrary in some circumstances, I feel justified in doubting the hypothesis suggested in his second sentence.

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DISCUSSION

Zvi Griliches: It is difficult to overemphasize the importance of Schmookler's work in this area. His recent papers have shown that we cannot think of inventions as the result of an exogenous process. Inventive activity may be very much affected by other economic variables, and moreover, it is likely to lag rather than lead some of the more important ones. However, the main new point of the current paper, while related to the previous work, is really different. In this paper Schmookler and Brownlee present the hypothesis that the rate of inventive activity (measured by patents granted) depends on expected absolute returns, derive from it the implication of a positive correlation between the number of patents and the size of the industry, and find such a correlation holding for a substantial number of years. In this comment I shall argue that: (1) the implication tested is in fact consistent with many alternative hypotheses; (2) a much stronger implication could be derived from their assumptions and tested by the same data; but that (3) the available data do not support either implication strongly, nor are they, moreover, very well suited for testing them. Much of the difficulty here arises from the intrinsic arbitrariness of the "industry" classification and the consequent brittleness of the "size of industry" concept.

The possibility that the number of patents and the size of an industry will be correlated does not depend on a particular maximization hypothesis. Such a relation would exist even if patents were randomly distributed. Assume, for example, that the probability of receiving a patent is the same for any worker, entrepreneur, or scientist, and not just for the "creative" ones and is independent of incentives or returns. Then a "larger" industry, one with more workers, will have more patents on the average. There are many more ways of deriving the implication of such a correlation. As such, it is a very weak test, if any, of the suggested maximization hypothesis.

But if we assume that the absolute returns to an invention are larger in a large industry, we would expect that there will be more inventive activity in larger industries per unit of size (somehow defined). Only this stronger version of the hypothesis has some predictive content and could conceivably be falsified by the data. Unfortunately the authors present no information on this aspect of their data (i.e., regression coefficients rather than just the r^2's). The actual numbers support neither hypothesis strongly. Examining one of the higher correlation years (1937-40), I found that the scatter was heavily dominated by one outlying observation—"Petroleum refining." Dividing the sample down the middle (by value-added) into two groups of eight industries each and computing rank correlations for each half separately one could not reject the independence hypothesis for either half at the 5 per cent level. Computing the ratio of patents to value-added and cross classifying it (less or more than one patent per 1 million dollars of value-added) against size (less or more than 150 million dollars) revealed a positive but not significant association between the rate of inventive activity per dollar of value-added and value-added. The resulting contingency table was $\frac{6 \mid 3}{2 \mid 5}$ with a Chi-square statistic of only about 1.0, which is not significant even at the 10 per cent level.

Even if observed, it is doubtful whether such a correlation would be much more than just an artifact of the measurement procedure. Patents are classified into functional groups which are then "assigned" by the investigators, *in toto,* to particular industries. Now, it is quite likely that "small" industries will get less than their "share" of patents, since the functional classification may not be fine enough. On the other hand, large industries are more likely to have patents assigned which do not really "belong" to them. Thus we may observe an essentially spurious correlation between the rate of inventive activity and size. I am afraid that we shall need better data and stronger and more detailed hypotheses to make more progress in this field.

The relationship between research and development expenditures and the subsequent growth in productivity, examined by Gustafson, is also subject to many measurement pitfalls. If, as Gustafson emphasizes, new products are an important output of the R and D industry, two questions have to be raised: First, do we want our productivity measures to reflect new products? And second, do the available measures of productivity in fact include this phenomenon? I would answer yes to the first question. If an industry succeeds in satisfying more wants, providing more utility, or otherwise improving the performance of its output, using the same or smaller amount of resources, I would tend to consider this an increase in the industry's productivity and would like to have an accounting system that attributed such increases correctly to the industries in which they originated. This would probably involve a broader concept of output and national income than is being used currently, but that would be an improvement, too. I see no reason, except the ease of measurement, to identify productivity with cost reducing innovations only. As to the second question, I agree with Gustafson that our usual price and output indexes do not measure new products adequately, and hence it may be impossible to discover this particular relationship (between R and D expenditures and productivity growth) from conventional measures. This criticism, however, is less applicable to Minasian's data. True, the deflators he uses do not take adequate account of new products in the chemical industry as a whole, but since Minasian deflates sales (or value-added) by these average prices, the differential new product productivity of individual firms is preserved in the data and may be one of the things that is measured by his correlations.

The problem of economies of scale—or more correctly economies of the scale of production run—has not been adequately solved either in this or other areas of production econometrics. It may be possible, however, to collect data on the average "batch size" in different industries and on changes in these batch sizes (or average length of production runs) and use this type of data in interpreting the usual productivity measures. Whether or not this suggestion proves feasible, the problem is very important and warrants more work and attention.

JAMES W. MCKIE: "The Economics of Research and Development" is much too vast a subject to be exhausted in a single session, or a single convention. The papers before us deal with particular aspects of the general problem. Gustafson's paper is primarily critical. Its warnings against confusing vegetative growth with technological change and against mismeasuring the effects of technological progress by overlooking the importance of product innovations should certainly be heeded. I have no wish to elaborate them by adding a third level of commentary, nor to offer a rejoinder on behalf of Terleckyj and Minasian.

The Schmookler-Brownlee paper explores new ground. The basic determinants of inventive activity that the authors select seem plausible enough, though one of them—"the kinds of stimuli which tend to induce inventive responses"—seems to contain practically the whole problem of determinants of inventive activity within itself. The authors relate these stimuli to economic factors such as the growth of an industry; but from another point of view they are psychological in nature, and a thorough analysis of the social-psychological stimuli would probably carry us well past the boundary at which economic analysis traditionally stops. The category of "creative individuals" raises similar doubts; and I am not sure that it would not turn out to be another of those useful tautologies like the "survival of the fittest."

Economic analysis can certainly help us to understand that part of the inventive process that depends on risk, cost, and prospective returns. This is a central problem of the Schmookler-Brownlee paper. They postulate a utility function, and apply it to a set of n "kinds of inventive activity" (or "industries") each of which has its own costs, mean expected return, and variance. I would like to suggest that the variance does not adequately describe a very important characteristic of such distributions: the skewness. We know how strongly the skewness affects risk assumption by lottery players, or by oil wildcatters; it seems to me that analogous effects of a skewed pay-off distribution in research and innovation might be fruitfully explored. Incidentally, the utility function presented here has a feature that I find puzzling: a particular kind of maximum, whose relation to the axioms of utility theory are not clear to me. The conclusion that allocation of resources among "kinds" of invention does not depend on the parameters of the utility function ought to be related to those axioms if it is to hold good for every utility function.

The authors are aware that their approach runs into the usual problem of counting and classifying inventions. One difficulty with the application of probability to invention is that the various classes are not necessarily independent, and the events within each industry class are almost certainly not. Inventions fall into loosely interrelated categories of development, each with sets and subsets that are linked and ordered in various ways. The importance of different items within a class varies tremendously. Some individuals partly contain others. The definition of *an* invention or *an* event is often ambiguous.

The same problem turns up in the use of the number of patents as a measure of inventive activity. Patents are not homogeneous. Perhaps patents weighted by their relative importance would be a better measure. Professor Schmookler has elsewhere made use of a weighting scheme in measuring patent activity, and such a scheme might be useful here. We need to know more about the distribution of weights or *ex post* pay-off as a guide to assessment of *ex ante* inducements, and I suggest again the possible analogy of a lottery. But neither a lottery analogy nor a weighting scheme can deal with the problem of complementarity and organic or sequential interdependence. Patents on whole products or processes subtend patents on the parts. The distinction between "basic" patents and "improvement" patents also illustrates the problem, especially when the improvement turns out to be more important than the basic invention. The zigzags of technological development may endow some patents with a high strategic value while others are hemmed in by closely competing inventions of different technological parentage, and still others depend on complementary patents for their working. It may be that the number of separable inventions cannot be uniquely counted.

Every alternative measure would seem to have the same defects or worse ones, however, and I have no universal modulus or common denominator to suggest. In some fields of study, critics should not be too carping, and the study of the economic causes and effects of technological change is one of them. We know so little about this enormously important matter, and we are so little able to systematize what knowledge we have, that we can profit from investigations of it from all angles. The Schmookler-Brownlee paper furthers our understanding of inventive activity in a number of ways. While the correlation of all determinants of invention with industry size may be open to question, the correlation of industry size with invention is itself illuminating, and students of the problem will be glad to have the evidence offered here. I can add no better proviso than the one suggested in the last sentence of their paper that to be certain on this matter, we shall have to know more about the economic potential of the inventions made. I doubt that certainty will be achieved in the near future.

STUDIES IN BUSINESS BEHAVIOR

INVESTMENT PLANS AND REALIZATIONS

By ROBERT EISNER*
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I. *The Realizations Function*

Investment plans may help forecast the future. They may also help in the explanation of actual investment. In this paper we shall use certain theories and data with regard to the explanation of actual capital expenditures to suggest improvements in the use of capital expenditure anticipations for forecasting purposes.

Our guiding principle is that investment and investment plans are determined essentially by the same variables. Aside from random disturbances, they differ because of changes in values of these determining variables between the points of time at which plans are formulated or revealed and the points of time at which they are executed. The difference between investment and investment plans may thus be explained by a "realizations function," the arguments of which are the differences between actual and expected values of variables which are relevant to investment.[1]

Capital expenditures, like so many other things in economics, may best be viewed as a resultant of forces of supply and demand. Clearly, particularly at the level of the individual firm, differences between actual and anticipated capital expenditures must relate largely to unanticipated changes in rather vaguely perceived supply conditions. For example, capital expenditures anticipated for a certain year may be substantially below (or above) anticipations because builders or

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[1] This approach has been developed by Franco Modigliani. See, most recently, Modigliani and Kalman J. Cohen, *The Role of Anticipations and Plans in Economic Behavior and Their Use in Economic Analysis and Forecasting* (Bur. of Econ. and Bus. Res., Univ. of Illinois, 1961), especially part II. For early empirical work with the concept see Robert Eisner, "Expectations, Plans and Capital Expeditures: A Synthesis of Ex-Post and Ex-Ante Data," in *Expectations, Uncertainty and Business Behavior*, ed. by Mary Jean Bowman (SSRC, 1958), pp. 165-88.

suppliers did not complete their work or deliver precisely when expected. A complete study of the realizations function would certainly have to pay serious attention to supply variables. In the present paper, which is intended to be suggestive rather than definitive, we shall restrict ourselves to essentially demand variables, and just a few of these.

We regard investment demand as determined chiefly by expectations as to the profitability of investment. It should be emphasized that the expected profitability of investment is by no means identical with past profit, or even past profit on investment. We have, in fact, shown elsewhere that at least in certain situations the apparent connection between past or current profits and capital expenditures can be explained by other variables, such as a succession of past sales changes or pressure on capacity, thus suggesting that profits are merely a "proxy variable" in the explanation of investment.[2] However, as a proxy, they retain usefulness in "reduced form" equations for purposes of forecasting, particularly as they are more readily available than the variables structurally related to capital expenditures.

II. *The Data*

In this brief report we shall offer preliminary findings of research with two bodies of anticipatory data and related statistical material. We shall refer first to individual firm responses (made available to the author by code number to preserve their confidential character) of McGraw-Hill capital expenditure surveys, along with a considerable amount of related accounting data from corporate financial statements. We have information for 727 firms, which does not include all firms that reported to McGraw-Hill. For some of the variables worked with in this paper, coverage is limited essentially to manufacturing. The set of usable observations is reduced considerably for this reason as well as because of instances of incomplete information which, for each regression, was derived from available financial reports and responses to McGraw-Hill surveys of three different years. The second set of data involved the Commerce-SEC quarterly reports of capital expenditures and capital expenditure anticipations, also supplemented with other information. The analysis here was carried out by major industry groups categorized as: all manufacturing, manufacturing durables, manufacturing nondurables, utilities, and commercial.

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[2] See the writer's "A Distributed Lag Investment Function," *Econometrica,* Jan., 1960, pp. 1-29; also Eisner and Robert H. Strotz, *Determinants of Business Investment* (monograph prepared for the Commission on Money and Credit), and Eisner, "Capital Expenditures, Profits and the Acceleration Principle," presented at meetings of the Conference on Research in Income and Wealth, Chapel Hill, N.C., in February, 1962 (publication anticipated in a forthcoming Conference volume).

Capital expenditures and capital expenditure anticipations were deflated by weighted averages of implicit GNP price deflators for other new (nonresidential) construction and producers' durable equipment. This deflator was also used for profits. BLS price indices were used to deflate sales. With the McGraw-Hill data, this entailed selection of one of eleven different deflators depending upon the product or subindustry category to which the firm was assigned by the person responsible for the surveys. Sales expectations were made available in the form of expected changes in the physical volume of sales, and therefore required no further deflation. Depreciation charges, gross fixed assets, and net worth were taken at their accounting values, without price adjustment. A guide to the notation and list of variables follows.

General notation

Subscript denotes period to which variable relates.

Presence of superscript denotes anticipatory variable. Time period in superscript denotes period in which anticipations are reported. *t*, *t*-1, 53, 54, 55, 56, 57, and 58 relate to years. *jt* indicates the *j*-th month of the *t*-th year. Symbols without subscripts denote quarterly data of the same quarter as the dependent variable. -1, -2, -2-*k*, etc., indicate lags in quarters from the quarter of the dependent variable.

I = capital expenditures
S = sales
P = profits
D = depreciation charges
F = gross fixed assets
W = net worth

Cross sections

I_t^{t-1} = capital expenditures of the year t anticipated at end of year $t-1$
S_t^{t-1} = sales of year t expected at end of year $t-1$
$\overset{r}{i}_t$ = capital expenditure realizations = $\dfrac{I_t - I_t^{t-1}}{F_{53}}$ or actual minus anticipated capital expenditures as a ratio of capital stock
$\overset{r}{s}_t$ = sales realizations = $\dfrac{S_t - S_t^{t-1}}{S_{t-1}}$ in actual minus expected sales (change) as a ratio of previous sales.

Time series

I^{-1} = previous quarter's anticipations of current capital expenditures
I_{-1}^{-2} = I^{-1} lagged one quarter
i^r = capital expenditure realizations = $\dfrac{I - I^{-1}}{I^{-1}}$ or actual minus anti-

cipated capital expenditures as a ratio of anticipations

$\Delta i^r = i^r - i^r_{-1}$

i_{-1} = lagged-capital-expenditures minus anticipations ratio $= \dfrac{I_{-1} - I^{-1}}{I_{-1}}$

$\overset{e}{S}_{-2}$ = implicitly expected sales lagged two quarters

$\overset{r}{s}_{-2}$ = sales realizations lagged two quarters $= \dfrac{S_{-2} - \overset{e}{S}_{-2}}{\overset{e}{S}_{-2}}$ or actual minus expected sales as a ratio of expected sales, all lagged two quarters

Δs = change-in-sales ratio $= \dfrac{S - S_{-1}}{S_{-1}}$

Δp = change-in-profits ratio $= \dfrac{P - P_{-1}}{P_{-1}}$.

III. *Cross-Section Analysis of McGraw-Hill and Related Data*

We have first used the set of McGraw-Hill and related data to estimate parameters of the realizations function,

$$\overset{r}{i}_t = b_0 + b_1 \overset{r}{s}_t + b_2 \overset{r}{s}_{t-1} + b_3 \frac{P_t}{F_{53}} + b_4 \frac{P_{t-1}}{F_{53}} + b_5 \frac{D_{53}}{F_{53}} + u, \qquad (1)$$

which relates the excess of actual over anticipated capital expenditures to current and lagged sales realizations (excess of actual over expected sales), current and lagged profits (before taxes), and depreciation charges.[3] Results, presented in Tables 1 and 2, offer some manifestation of the existence of the realizations function, as well as suggestions as to the inadequacy of the data.

The explained portion of the variance in investment realizations is small, so small that in one year (1957) we are unable on the basis of an .05 probability test to reject the hypothesis that the coefficient of multiple determination is zero in the important large-firm group. Further, there appear to be substantial overestimates imbedded in mean

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[3] In an effort to eliminate extreme observations, we included only firms for which

$$|\overset{r}{s}_t|,\ |\overset{r}{s}_{t-1}|,\ \left|\frac{P_t}{F_{53}}\right|,\ \left|\frac{P_{t-1}}{F_{53}}\right| < 1, \qquad \frac{D_{53}}{F_{53}} < .4, \text{ and } |\overset{r}{i}_t| < .3.$$

In the work with 1958 capital expenditures discussed below, the condition was again set that the sales variables be in the interval (-1,1) and further, with profits here measured after taxes, that

$$\left|\frac{P_{58}}{W_{57}}\right|,\ \left|\frac{P_{57}}{W_{57}}\right|,\ \frac{D_{57}}{F_{57}},\ \frac{I^{57}_{58}}{F_{57}}, \text{ and } \frac{I_{58}}{F_{57}} < .4.$$

TABLE 1

CROSS SECTIONS, FOR 1955, 1956, AND 1957 CAPITAL EXPENDITURES

Variables	REGRESSION COEFFICIENTS AND STANDARD ERRORS			MEANS AND STANDARD DEVIATIONS		
	$t=1955$	$t=1956$	$t=1957$	$t=1955$	$t=1956$	$t=1957$
A. ALL FIRMS						
Constant term	−.014	.024	.021	—	—	—
	(.011)	(.011)	(.011)			
$\overset{r}{s}_t$	.074	.031	.025	.050	−.043	−.055
	(.036)	(.037)	(.033)	.115	.118	.125
$\overset{r}{s}_{t-1}$	−.044	−.018	.003	−.033	.045	−.038
	(.035)	(.027)	(.032)	.115	.157	.126
$\frac{P_t}{F_{53}}$	.057	.052	−.052	.271	.299	.282
	(.031)	(.040)	(.039)	.165	.215	.211
$\frac{P_{t-1}}{F_{53}}$	.011	−.040	.045	.234	.281	.309
	(.029)	(.045)	(.038)	.167	.189	.220
$\frac{D_{53}}{F_{53}}$	−.145	−.548	−.538	.057	.057	.057
	(.171)	(.181)	(.176)	.024	.022	.023
$\overset{r}{i}_t$	*	*	*	.0004	−.005	−.011
				.043	.056	.054
n	118	196	196			
$\hat{R}^2$	.077	.043	.057			

B. LARGE FIRMS (1953 GROSS FIXED ASSETS \$100,000,000 OR MORE) ONLY

Variables	$t=1955$	$t=1956$	$t=1957$	$t=1955$	$t=1956$	$t=1957$
Constant term	−.017	.033	.041	—	—	—
	(.017)	(.016)	(.022)			
$\overset{r}{s}_t$	.123	.184	.114	.059	−.024	−.036
	(.054)	(.056)	(.082)	.108	.096	.091
$\overset{r}{s}_{t-1}$	.012	−.106	.016	−.012	.072	−.024
	(.082)	(.048)	(.075)	.072	.114	.095
$\frac{P_t}{F_{53}}$	−.146	−.005	−.068	.258	.263	.256
	(.082)	(.077)	(.106)	.154	.182	.178
$\frac{P_{t-1}}{F_{53}}$	.222	−.014	.069	.211	.264	.271
	(.083)	(.078)	(.103)	.150	.172	.185
$\frac{D_{53}}{F_{53}}$	−.178	−.614	−.848	.059	.059	.059
	(.268)	(.275)	(.387)	.021	.020	.020
i_t	*	*	*	−.011	−.020	−.012
				.042	.046	.056
n	50	61	63			
$\hat{R}^2$	.238	.289	.033†			

* Dependent variable.

† Not significant at .05 probability level.

capital expenditure anticipations.[4] Nevertheless, it may also be noted that the coefficients of the current sales realizations term are positive for each year's capital expenditures. And they are decidedly higher for the largest firms (1953 gross fixed assets of 100 million dollars or more) whose plans and expectations might have been expected to be most meaningful and which, dollar-wise, would loom largest in aggregate capital expenditures.[5]

Combination of the cross sections relating to all three years (by adding the matrices of moments about zero) makes clear that the coefficient of the current sales realizations term is distinctly and significantly positive. As shown in Table 2, it is .051 for all firms and .137 for the subset of largest firms, when variables with nonsignificant coefficients are eliminated from the regression. The latter coefficient may be interpreted as saying that those large firms whose error in sales expectations, expressed as a ratio of previous sales, was 7.3 percentage points more than the mean error in sales expectations of large firms, tended to show a deviation from the mean error in capital expenditure realizations equal to 1 per cent of capital stock. Put more impressively, since capital expenditures were about one-eighth of gross fixed assets, each 1 per cent deviation from the mean error of sales expectations in the cross section was associated with somewhat more than a 1 per cent (8 × .137 × 1 per cent) deviation from the mean error of capital expenditure anticipations.[6]

Neither current nor lagged profits contribute to the explanation of the error in capital expenditure anticipations. That sales realizations lagged one year also show little or no relation to investment realizations should not be surprising as one might expect that these sales realizations, pretty much known at the time capital expenditure an-

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[4] These overestimates are, however, partly related to our method of price deflation; they are generally less in undeflated data. This stems from our deflation of anticipations on the basis of indices of prices current at the time anticipations were reported, while actual expenditures are deflated by indices of the usually higher prices current at the time the expenditures were carried out.

[5] Gross fixed assets of 516 "small" McGraw-Hill firms for which data were available totaled 22.1 billion dollars in 1957. The corresponding figure for 191 "large" firms was 139.5 billion dollars, some 86 per cent of the total for all firms. An even higher proportion of capital expenditures (see means of $\frac{I_{58}}{F_{57}}$ in Table 3) tends to be accounted for by the large firms.

[6] The greater sales realization coefficient for the larger firms may reflect again the kind of statistical phenomena associated with the distinction between "permanent" and "transitory" components of income. (See the writer's "The Permanent Income Hypothesis: Comment," *A.E.R.*, Dec., 1958, pp. 972-90.) Capital expenditures should respond to deviations from previously expected rates of sales when the deviations are expected to persist. But in small firms, whose sample of experience is small, random or transitory fluctuations in sales may be relatively large. In giant, multiproduct, multimarket firms, transitory variations in sales are likely in greater measure to cancel each other out. The variance in sales realizations among these firms would hence in larger proportion be a variance of a "permanent" component which would be related to the variance in capital expenditure realizations.

TABLE 2

CROSS SECTIONS FOR 1955, 1956, AND 1957 CAPITAL EXPENDITURES COMBINED

Variable	Regression Coefficients and Standard Errors						Means and Standard Deviations	
	All Firms			Large Firms Only			All Firms	Large Firms Only
Constant term	.015 (.007)	.017 (.006)	.017 (.006)	.020 (.011)	.020 (.011)	.020 (.011)	—	—
$\overset{r}{s}_t$	.048 (.019)	.051 (.018)	.051 (.018)	.140 (.034)	.134 (.033)	.137 (.033)	−.026 .127	−.005 .106
$\overset{r}{s}_{t-1}$	—	−.008 (.016)	—	—	−.059 (.033)	—	−.005 .142	.013 .105
$\frac{P_t}{F_{53}}$	.010 (.012)	—	—	−.009 (.022)	—	—	.286 .203	.259 .172
$\frac{D_{53}}{F_{53}}$	−.405 (.103)	−.387 (.101)	−.386 (.101)	−.549 (.184)	−.566 (.170)	−.575 (.171)	.057 .023	.059 .020
i_t^r	*	*	*	*	*	*	−.006 .053	−.015 .049
n	510	510	510	174	174	174		
$\hat{R}^2$	.036	.035	.036	.120	.136	.124		

* Dependent variable.

ticipations were reported, should have little effect on the difference between actual and anticipated investment.

The negative coefficients obtained for the depreciation variable, particularly with regard to realizations of 1956 and 1957, require further study. They may stem from the implicit constraint (that it equal unity) placed on the coefficient of capital expenditure anticipations, along with a tendency for depreciation and capital expenditure anticipations to enjoy a common "noise." As shown in Table 3, when the coefficient of capital expenditure anticipations is estimated freely it appears to be somewhat less than .5. To the extent that this disturbance or error in the anticipations variable is responsible for its low regression coefficient, the depreciation variable might then serve to correct for the violence done by constraining the coefficient of capital expenditure anticipations, noise and all, to be unity. In any event, Table 3 indicates that the coefficient of 1958 capital expenditure realizations on depreciation which would be obtained by subtracting a freely estimated capital expenditure anticipations equation from an analogous, freely estimated capital expenditures equation, is almost exactly zero.[7]

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[7] Profits here were taken after taxes and were deflated by 1957 net worth. Depreciation was measured as the ratio of 1957 depreciation charges to 1957 gross fixed assets.

It may be noted further in Table 3 that anticipations of 1958 capital expenditures and actual 1958 capital expenditures are essentially functions of the same variables, with actual sales change replacing previously expected sales change from 1957 to 1958 as we move from the anticipations to the actual expenditures function. In fact, if the estimated equation for anticipated capital expenditures is subtracted from that for actual capital expenditures in 1958, the only variable in the resultant equation with a significantly nonzero coefficient—approximately +.08—would be 1958 sales realizations. It is striking to note how consistent this, in particular, is with the form of equation (1).

TABLE 3

CROSS SECTIONS, 1958 CAPITAL EXPENDITURES, ALL FIRMS

Variables	REGRESSION COEFFICIENTS AND STANDARD ERRORS			Means and Standard Deviations	Simple Correlation (r) with $I^{57}_{58} \div F_{57}$ and $I_{58} \div F_{57}$
	For $\frac{I^{57}_{58}}{F_{57}}$	For $\frac{I_{58}}{F_{57}}$	For $\frac{I_{58}}{F_{57}}$ on $\frac{I^{57}_{58}}{F_{57}}$		
Constant term	.021 (.013)	.009 (.010)	−.002 (.009)	—	—
$\frac{S_{58}-S_{57}}{S_{57}}$	—	.080 (.026)	.047 (.022)	−.065 .152	.279 .268
$\frac{S^{57}_{58}-S_{57}}{S_{57}}$	.064 (.029)	−.020 (.027)	−.023 (.023)	−.021 .126	.162 .106
$\frac{S_{57}-S^{56}_{57}}{S_{56}}$	.023 (.030)	.020 (.024)	.014 (.020)	−.052 .120	.068 .111
$\frac{P_{58}}{W_{57}}$	—	−.028 (.075)	−.057 (.064)	.071 .064	.299 .327
$\frac{P_{57}}{W_{57}}$	.263 (.078)	.334 (.095)	.258 (.081)	.089 .047	.262 .371
$\frac{D_{57}}{F_{57}}$	.645 (.212)	.649 (.167)	.367 (.145)	.052 .017	.227 .276
$\frac{I^{57}_{58}}{F_{57}}$	*	—	.432 (.049)	.075 .054	1.000 .624
$\frac{I_{58}}{F_{57}}$	—	*	*	.065 .046	.624 1.000
n	201	201	201		
R^2	.133	.252	.468		
$\bar{R}^2$	.111	.225	.446		

* Dependent variable.

For

$$.080\frac{S_{58}-S_{57}}{S_{57}}-.020\frac{\overset{57}{S}_{58}-S_{57}}{S_{57}}-.064\frac{\overset{57}{S}_{58}-S_{57}}{S_{57}}=.080\overset{r}{s}_{i}-.004\frac{\overset{57}{S}_{58}-S_{57}}{S_{57}},$$

where $-.004$ is certainly as close to zero as one might dare expect. We may observe finally that whereas some 39 per cent of the variance in capital expenditures as a ratio of fixed assets is explained by the anticipated capital expenditures ratio, the multiple regression which adds other explanatory variables is able to account for almost 47 per cent of this variance.

IV. *Time Series Analysis of Commerce-SEC and Related Data*

With 48 to 52 reasonably usable observations of postwar quarterly time series data we employ a modified Koyck-type distributed lag formulation[8] for our analysis. This involves two assumptions: (1) failure of anticipatory data to reflect fully current experience at the time they are reported, as well as the interval necessary to adjust capital expenditures to changed conditions, cause capital expenditure realizations to be affected by sales realizations and other variables over more than one quarter; (2) the adjustment over time of capital expenditure realizations to the variables which determine them may be expressed as a linear function in which, after a certain point, coefficients of successively lagged independent variables form a decaying geometric series.

The general underlying equation assumed for the time series was:

$$\overset{r}{i}=a_0+a_1\Delta s_{-1}+a_2\Delta p_{-1}+\sum_{k=0}^{\infty}[\gamma^{k}(a_3\Delta s_{-2-k}+a_4\Delta p_{-2-k}+a_5 i_{-1-k})]+u. \quad (2)$$

For manufacturing, we were able to construct crude, synthetic quarterly sales realizations series, the high serial correlation of which, however, made the inclusion of two sales realization terms undesirable. In using the sales realization series in manufacturing we assumed to be zero the parameter of the single-lagged sales realization variable, estimates of which had been relatively small. In this case we therefore worked from the underlying relation:

$$\overset{r}{i}=a_0+a_2\Delta p_{-1}+\sum_{k=0}^{\infty}[\gamma^{k}(\overset{r}{a}_3\overset{r}{s}_{-2-k}+a_4\Delta p_{-2-k}+a_5 i_{-1-k})]+u. \quad (3)$$

As may be readily shown, we may obtain estimates of all of the parameters from a least squares regression of the transformed equation,

$$\Delta i^{r}=b_0+b_1\Delta s_{-1}+b_2\Delta s_{-2}+b_3\Delta p_{-1}+b_4\Delta p_{-2}+b_5 i_{-1}+b_6 i^{r}_{-1}+v, \quad (4)$$

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[8] L. M. Koyck, *Distributed Lags and Investment Analysis* (North Holland, 1954). However, Koyck used only one independent variable at a time.

where $\gamma = 1 + b_6$, $a_0 = \dfrac{b_0}{1-\gamma}$, $a_1 = b_1$, $a_2 = b_3$, $a_3 = b_2 + \gamma b_1$, $a_4 = b_4 + \gamma b_3$, $a_5 = b_5$, and $v = u - \gamma u_{-1}$. (When we substitute s^r_{-2-k} for Δs_{-2-k} and delete Δs_{-1}, we of course assume $a_1 = b_1 = 0$, and eliminate Δs_{-1} from the estimating equation.)

The synthetic quarterly expected sales series used in manufacturing was constructed by assuming first that expected annual sales could be written, $S^e_t = (1 + \Delta s^e_t)\ S_{t-1}$, where Δs^e_t was the reported expected relative change in annual sales, made known on the average in February. We assume further that the expected change in annual sales is to be realized by a constant linear[9] change in monthly sales. Then, considering the sales of January of the current year as already known and extrapolating the sales of the following January, we can derive

$$S^e_{jt} = S_{1t} + \left(\frac{j-1}{6}\right)\left(\frac{S^e_t - S_{1t}}{11} - S_{1t}\right) \qquad j = 2, 3, \cdots, 13$$

$$(S^e_{13\,t} = S^e_{1,t+1}). \tag{5}$$

Expected quarterly sales, S^e, are simply the sum of the (synthetic) expected sales of each of the months of the quarter.

Accepting the widespread view that businessmen generally expect that "tomorrow will be like today," we may consider the change in profits ratio as a measure of changes in expected profits. To the extent that changes in expected profits are a proxy for changes in the expected profitability of investment we would tend to secure positive estimates of the coefficients of the Δp's in the underlying equations.

The lagged-expenditures minus anticipations ratio, i_{-1}, may serve to correct for some of the "noise" or other error in anticipations. It may also sharpen the relation between other lagged independent variables and capital expenditure realizations by adjusting for the capital expenditures which take place before the period of realizations which we are trying to predict.

Table 4 shows both sales realizations and changes in profits to be significant in the explanation of capital expenditure realizations. For all manufacturing and for manufacturing nondurables alone, the regressions including the lagged-expenditures minus anticipations variable explain over 60 per cent of the variance in the dependent variable,

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[9] This construction was in large part suggested by Peter Pashigian but he has assumed a constant per cent change in expected monthly sales in his formulation in "The Accuracy and Determinants of Sales Anticipations," presented at the Dec., 1961, Econometric Society Meetings.

change in capital expenditure realizations, in the estimating equation.[10]

Table 5 offers estimates of parameters of the transformed equations for manufacturing durables, manufacturing nondurables, utilities, and commercial capital expenditure realizations. In each of these industry groups the two sales change ratio variables, Δs_{-1} *and* Δs_{-2}, were used instead of the one sales realization variable, s^r_{-2}. However, difficulty in securing seasonally adjusted "sales" data appropriately corresponding to capital expenditures led us to use electric revenues for sales, in the case of utilities, and retail sales for the "commercial" category. This may account for the somewhat uneven character of our results. In manufacturing nondurables we see a relatively spectacular confirmation of the role of changes in sales in determining capital

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[10] It must be observed, however, that without i_{-1} in the regression, the coefficient of determination is markedly less and estimates of the parameters of the other variables are lower and less certain. The exact role of i_{-1} in explaining capital expenditure realizations and in affecting estimates of parameters of other variables would appear to require further examination.

TABLE 4

TIME SERIES QUARTERLY DATA, MANUFACTURING CAPITAL EXPENDITURES 1948–III TO 1960–IV

Variables	All Manufacturing			Manufacturing Nondurables Regression Coefficients and Standard Errors
	Regression Coefficients and Standard Errors		Means and Standard Deviations	
	Without i_{-1}	With i_{-1}		
Constant term	−.011	−.007	—	−.004
s^r_{-2}	.189 (.121)	.316 (.094)	.007 .057	.669 (.214)
Δp_{-1}	.182 (.048)	.190 (.036)	.004 .126	.166 (.077)
Δp_{-2}	.078 (.048)	.108 (.037)	.008 .125	.105 (.079)
i_{-1}	—	.435 (.073)	−.022 .066	.720 (.151)
i^r_{-1}	−.507 (.125)	−.751 (.102)	−.016 .057	−1.063 (.153)
Δi^r	*	*	−.0005 .052	*
n	50	50		33
$\bar{R}^2$	.392	.655		.613
Durbin-Watson Ratio	1.953	1.943		

* Dependent variable.

TABLE 5

TIME SERIES QUARTERLY DATA, MANUFACTURING DURABLES AND NONDURABLES, 1948–51 TO 1960–64, AND UTILITIES AND COMMERCIAL CAPITAL EXPENDITURES

Variables	Regression Coefficients and Standard Errors				Means and Standard Deviations			
	Manufacturing		Utilities†	Commercial‡	Manufacturing		Utilities†	Commercial‡
	Durables	Nondurables			Durables	Nondurables		
Constant term	−.0004	−.018	−.012	.002	—	—	—	—
Δs_{-1}	.119 (.224)	.664 (.316)	.492 (.303)	.263 (.241)	.008 .054	.008 .020	.023 .035	.009 .026
Δs_{-2}	.222 (.198)	.797 (.325)	.048 (.265)	−.048 (.238)	.008 .054	.009 .020	.022 .035	.008 .026
Δp_{-1}	.079 (.069)	.012 (.064)	−.122 (.066)	.108 (.062)	.014 .176	.004 .101	.023 .145	−.001 .092
Δp_{-2}	.005 (.069)	.014 (.063)	.043 (.066)	.063 (.063)	.017 .172	.004 .100	.018 .148	.0002 .092
i_{-1}	.423 (.108)	.533 (.088)	.386 (.091)	.697 (.094)	−.021 .078	−.021 .068	−.050 .071	.004 .061
$i^r{}_{-1}$	−.541 (.108)	−.825 (.093)	−.680 (.118)	−.952 (.090)	−.009 .080	−.016 .064	−.025 .059	.011 .063
Δi^r	*	*	*	*	−.001 .068	−.003 .064	−.004 .065	−.005 .063
n	52	52	48	48				
$\hat{R}^2$	.379	.659	.537	.719				
Durbin-Watson Ratio	1.742	1.857	2.129	1.179				

* Dependent variable.

† Sales change variables relate to electric revenues only.

‡ Sales change variables relate to retail sales only.

expenditure realizations and, inferentially, in affecting actual capital expenditures. It may be noted that the total effect of the two sales change variables here is greater than that of the one sales realizations variable included in the 33 observation regression of nondurables realizations presented in Table 4. This sales change effect seems to have replaced the (proxy?) role assumed by change in profits, for which neither of the coefficients is any longer significantly positive.

Results are less sharp or somewhat ambiguous in the other industry groups but, in addition to the difficulties with regard to commercial and utilities' sales already cited, we may offer the tentative hypothesis that in these other industries the character of capital expenditures may have been more predominantly longer run and hence capital expenditure realizations would be less likely to be affected by the essentially short-run investment demand factors that we have been considering. One might, for example, even offer the fairly wild conjecture that the negative coefficient of Δp_{-1} for utilities captures inversely the role of short-run demand factors in other industries. By this reasoning, where investment demand elsewhere slackens, supply bottlenecks are eased in capital-goods-producing industries and deliveries to utilities are accelerated.

That the findings in none of the industry groups is clearly inconsistent, however, with the broad pattern we are developing, should be apparent from examination of Table 6, which sets forth the estimates of parameters of the underlying equations, as retransformed from the parameter estimates presented in Tables 4 and 5. The sales change coefficients are positive in all cases except one (where the value is virtually zero). In comparing the magnitude of impact of profits change and sales change variables, however, we should note that the standard deviation of the Δp's was some three to five times as large as that of the Δs variables. With smaller coefficients, profits changes might still have accounted, therefore, for more of the fluctuations in capital expenditure realizations. This conceded, we may point out that by usual statistical tests, the profits change ratios seemed clearly to play an independent role only in those regressions utilizing s^r, and hence lacking a considerable measure of the changes in demand that might be expressed in movements of sales.

V. *Conclusion*

In evaluating the various estimates obtained from the cross sections and time series we must recognize first the different forms of the variables. Realizations in the cross sections, it should be recalled, were expressed as ratios of fixed assets, which are roughly twelve to fourteen times as great as capital expenditure anticipations, which formed the denominator in the time series capital expenditure realization ratios. Then, since the cross sections deal with yearly data while the time series data are quarterly, we should look in Table 6 to the values of the long-run adjustment coefficients, and in particular, a_s^L, to secure figures to compare with variables of similar form in the cross section. When we do this we find that the cross-section and time series estimates are not, at least, outrageously different.

That our results from the two bodies of data are not more inconsistent is perhaps surprising. There is certainly reason to doubt that in making their critical estimates of the expected future profitability of investment, individual firms should see differences between their own experience and that of the mean of all firms in the same way as

TABLE 6

TIME SERIES DISTRIBUTED LAG REALIZATIONS FUNCTIONS

$$i^r = a_0 + a_1\Delta s_{-1} + a_2\Delta p_{-1} + \sum_{k=0}^{\infty} [\gamma^k(a_3\Delta s_{-2-k} + a_4\Delta p_{-2-k} + a_5 i_{-1-k})]$$

and, for all manufacturing,

$$i^r = a_0 + a_2\Delta p_{-1} + \sum_{k=0}^{\infty} [\gamma^k (a_3 s^r_{-2-k} + a_4\Delta p_{-2-k} + a_5 i_{-1})]$$

(Transformations from Tables 4 and 5.)

Variable or Parameter	m	Coefficients (a_m)				
		Manufacturing			Utilities	Commercial
		All	Durables	Non-durables		
Constant term	0	−.009	−.001	−.022	−.018	.002
Δs_{-1}	1	—	.119	.664	.492	.263
Δp_{-1}	2	.190	.079	.012	−.122	.108
γ	—	.249	.459	.175	.320	.048
Δs_{-2-k}	3	—	.277	.913	.205	−.036
s^r_{-2-k}	3^r	.316	—	—	—	—
Δp_{-2-k}	4	.155	.041	.016	.004	.068
i_{-1}	5	.435	.423	.533	.386	.697
$a^L_s = a_1 + \frac{a_3}{1-\gamma}$		.421	.632	1.771	.792	.226
$a^L_p = a_2 + \frac{a_4}{1-\gamma}$		.396	.155	.032	−.116	.180

all firms should see changes in the general experience, which is at least the proximate focus of a time series view. Much remains to be done to pull from both cross sections and time series the essential economic content that relates not to the frequently transitory components of variance of past variables but to expected relatively long-run future conditions. But we may conclude with the judgment that work to date argues for the potential usefulness of the realizations function. With due attention to both the formation and role of expectations and the structural relations underlying investment, we may look for substantial further improvement in the value of anticipatory data in forecasting and economic analysis.

LOCATION DECISIONS OF MANUFACTURERS

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Better understanding of the process by which firms and workers move is crucial, not only to the theory of industrial location, but in developing public policies, for instance, to minimize the difficulties resulting from tariff reductions or to help depressed areas. The purpose of this paper is to analyze the factors which govern location decisions in the manufacturing sector of the economy, using data from a survey of *Location Decisions and Industrial Mobility in Michigan* [1] conducted by the Survey Research Center in spring 1961.

The study was based on personal interviews with top executives (presidents, vice-presidents, plant managers) of 239 Michigan manufacturing plants in spring 1961. The sample of plants was drawn by probability methods and was designed to be representative of all manufacturing plants in Michigan with only minor exclusions. The probability that a plant would fall into the sample was proportional to its employment, and responses were weighted by employment. Interviews were obtained with top executives of 91 per cent of the sampled plants, including the Big Three automobile companies. However, the data for these three companies were not included in the statistical tabulations, since they might have dominated the results. Each interviewer asked the identical sequence of questions, but respondents were encouraged to answer each question at length in their own words, describing fully their situation and attitudes.

We shall distinguish between three kinds of location decisions: (1) the location of new firms, (2) the decision of existing firms to stay at their present location or, alternatively, to relocate, and (3) location decisions which occur in connection with expansion of facilities. Although in practice this classification is not always clear cut, we shall demonstrate that these three kinds of decisions are arrived at in different ways and dominated by different considerations. It will be shown that the traditional cost and demand factors have indeed an important influence on location decisions, but that other economic as well as noneconomic factors may play a significant role under certain circumstances. Thus the assumption of profit maximization is too restrictive for an analysis of location decisions. The process of industrial location is clarified if we recognize other preferences in addition to the desire for maximum profits.

Location has been studied in different ways. One can study the inputs and market locations of an industry and determine the locations which minimize the costs of manufacture and shipping (and possibly also costs in time). Insofar as transportation is a major cost, as markets and inputs are not themselves subject to movement and as necessary resources are available only in a limited number of locations, this type of analysis can lead to useful conclusions. This approach was used successfully, for instance, by Walter Isard in his analysis of the iron and steel industry [2] and in Edgar M. Hoover's classical study of the shoe and leather industry [3]. However, for many industries transport cost differentials are not a dominant location factor or major inputs are available in many places. Hence, although some locations are ruled out by cost and market considerations, there remain many alternative locations which are feasible. Under these circumstances there is a purpose to going beyond factors bearing directly on costs and market access and to examine also some "nonpecuniary factors." We mean by nonpecuniary factors those which have no obvious effect on dollar cost and revenue (personal preferences for a location, good schools) as well as those whose impact on costs and revenues is indirect and cannot be readily quantified (industrial climate, business contacts). We are not distinguishing between the theoretical and the empirical, nor between the deductive and the pragmatic—they should go hand in hand. But we are distinguishing between the limited use of a simple theory focused on a few economic factors as against a more comprehensive theory which attempts to select from among a larger number of possible influences those which really matter under given circumstances.[1]

Once we broaden the scope of our theory to include a larger range of preferences on the part of decision-makers, we must have more detailed information. It is appealing then to start with a representative sample of plants and interview their managers. Instead of checking out the presumptive influence of a few things which can be measured in dollars and cents, we find out by asking which of a large number of factors affect industrial location decisions.

The notion that firms may not maximize profits in the short run has been discussed primarily as regards decisions about the size of output and price. In relation to location decisions it would mean, among other things, that as costs and market advantages change over time, the firm may prefer stability of location to repeated moves in order to realize an optimum. Needless to say, when we speak of stability of location, we do not imply that adjustment to change will not take place under any circumstances. Rather, it is argued that change will take place when, but only when, the firm consciously recognizes a sizable deviation from the maximand.

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[1] For an earlier discussion of this approach, see [4].

With these ideas in mind, it was assumed that prevailing attitudes among industrialists—subjective feelings of satisfaction or dissatisfaction with the present location—are an important variable in any attempt to explain or predict location decisions. No doubt these attitudes are to a large extent an outgrowth of objective economic factors. Why then do we introduce attitudes into the analysis instead of the so-called "objective" conditions? There are two reasons. First, advantages and disadvantages of a location are difficult to measure in cost and revenue terms. For example, labor cost comparisons between states must take into account wage rates for equal work (which is not easy to define), costs of fringe benefits, as well as labor productivity, reliability, and versatility. Such factors as market potential or industrial climate are still more difficult to measure or compare. The measurement problem appears formidable if we consider that the attractiveness of a location may also be influenced by such factors as union attitudes, the legal climate, zoning regulations, schools, recreational facilities, and the like.

Second, even when it can be determined that certain cost differentials exist between locations—say that taxes differ by an amount equivalent to 3 per cent of the wage bill—it is not clear how important such a differential is to the manufacturer. Certainly, favorable and unfavorable locational factors are not additive in the simple sense that dollars and cents are. A combination of unfavorable factors may bring about serious discontent, even though each factor by itself may be of minor consequence. There may be a threshold below which unfavorable developments do not matter greatly, but above which they affect location decisions. The translation of objective developments into subjective-attitudinal rather than financial terms therefore not only facilitates the measurement problem but provides us with a meaningful variable for research on the decision-making process.

This is not the place to describe in detail how satisfactions and dissatisfactions were measured in the survey. It suffices to say that a large number of questions were asked to assess attitudes toward specific conditions and changes in Michigan. These were then combined to construct an attitude scale which achieves a rough rank-ordering of firms from the most to the least satisfied with their location in Michigan [1].

The Location of New Firms

The location of a new firm undoubtedly is a genuine decision in the sense that possible alternatives are carefully weighed and an optimum is sought. What are the considerations that enter into such decisions? Among other things, respondents were shown a list of twenty-one locational factors and asked to identify the five which would be most crucial in locating a plant such as theirs. According to Table 1, six factors each were rated as being of major importance by manufacturers accounting for 50 per cent or more of employment. They are, in order of frequency: labor costs, proximity to markets, availability of skilled labor, industrial climate, the tax bill, and proximity to materials. By and large, these are the cost and demand factors stressed by traditional location theory. The one nonpecuniary factor among the six top-ranking considerations is industrial climate, defined in the survey as "attitudes of the state and community toward industry."

The discussion was then shifted from general locational principles to a particular location decision. Executives of plants which were opened in Michigan since 1940 were asked why this specific plant was located in Michigan. In this context noneconomic reasons were mentioned much more often. Table 2 shows that executives of plants accounting for half of the employment in plants established in Michigan since 1940 reported that their plant was located in Michigan by historical accident—because the founder lived there, liked it there, or had valuable business connections there. Twenty per cent (in some cases the same executives) said that they happened to find a good plant site in Michigan or that they had an attractive opportunity to buy a business in Michigan.[2] The remaining responses related primarily to cost and demand factors, with proximity to customers receiving particularly frequent mention. Corresponding questions about selection of the specific plant site within Michigan again show that historical accident and personal preferences of the founder(s) play an important role.[3]

Many executives mentioned cost and market factors as well as personal and business ties. It may be inferred from the survey that often a number of alternative locations may be feasible for a new firm on the basis of cost and demand considerations. The owner's personal preferences and contacts may then be decisive in selecting among the feasible locations.

Both parts of Table 2 show sizable differences by size of firm. According to manufacturers' explanations, personal considerations and historical accident play a much greater role in the location of factories of smaller firms than in the location of factories which are part of large multiplant firms. In studying the interviews, one obtains the distinct impression that more careful cost and market calculations are made by

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[2] All the analysis is in terms of the proportions of employment represented, but for ease in writing, phrases such as "proportion of executives" are used occasionally.

[3] Personal preferences also emerged as an important factor in [5] and [6].

TABLE 1

IMPORTANT LOCATIONAL FACTORS IN MICHIGAN BY INDUSTRY

(Percentage of Employment Represented)

Important Locational Factors Mentioned‡	All Michigan	Industry					
		Transportation Equipment	Machinery (including electrical)	Fabricated Metals	Rubber, Plastics, Petroleum, and Chemical Products	Manufactured Consumers Goods§	Primary Materials Industries**
Labor costs (wages, productivity)	65%	69%	59%	68%	76%	57%	73%
Proximity to markets (including transportation costs)	62	75	56	55	70	77	54
Availability of labor (skills, supply)	56	50	67	68	39	66	40
Industrial climate	53	19	55	50	61	54	67
Taxes	52	50	53	65	48	49	48
Proximity to materials (including transportation costs)	50	78	44	25	48	49	60
Water	41	44	35	25	70	29	54
Unionism	23	19	30	28	15	23	15
Community factors	14	23	12	11	9	12	14
Marketing facilities	11	*	8	10	3	20	23
Traffic access; parking	7	6	13	3	3	6	4
Zoning, other regulations	4	14	3	3	3	*	2
Local sources of financing	3	3	3	*	3	6	4
Total	†	†	†	†	†	†	†

* Less than ½ per cent.

† Totals differ from 100 per cent because respondents mentioned more than one factor.

‡ Factors either selected as important from list of twenty-one locational factors or mentioned in answer to the question: "Are there any minimum requirements which must be met for locating plants in this line of industry—for instance, a very large or very pure water supply, an unusually large or particularly skilled labor force?"

§ Includes such industries as food, textiles, and furniture.

** Includes such industries as lumber, paper, and primary metals.

TABLE 2

EXPLANATIONS GIVEN FOR LOCATION OF PLANT BY NUMBER OF PLANTS OPERATED BY FIRM

(Percentage of Employment Represented)

	All Michigan	NUMBER OF PLANTS OPERATED BY FIRM		
		One Plant	2–4 Plants	5 or More Plants
Main Reasons for Locating Plant in Michigan‡				
Personal reasons; chance	50%	63%	52%	32%
Opportunity—found good site, etc.	19	23	20	14
Proximity to customers; central location	15	17	20	4
Proximity to auto industry	8	14	4	4
Labor advantages	7	*	12	14
Proximity to materials	6	3	8	9
Local concessions and inducements; encouragement by groups or persons	2	*	*	4
Better tax situation	1	*	*	4
State already established as a center for the industry	1	*	4	*
Total	†	†	†	†
Main Reasons for Locating Plant at Particular Site§				
Personal reasons; chance	33%	55%	32%	20%
Opportunity—found good site, etc.	18	27	16	14
Proximity to customers; central location	15	16	15	14
Proximity to auto industry	13	7	14	12
Labor advantages	7	4	9	7
Proximity to materials	12	7	6	15
Local concessions and inducements; encouragement by groups or persons	4	2	4	7
Better tax situation	3	4	6	2
Area already established as a center for the industry	2	1	2	4
Total	†	†	†	†

* Less than ½ per cent.

† Totals differ from 100 per cent because some respondents mentioned more than one reason, and for some others the reasons were not ascertained.

‡ Asked only at plants that started operating at present locations after 1940. The question was: "What were the main reasons for locating the plant in Michigan?"

§ The question was: "What were the main reasons that operations were set up here in [name of town]?"

larger than by smaller firms. It also seems that attempts to evaluate not only current costs and market factors but also future trends are more common among larger than among smaller firms. The following quotations may serve to illustrate the difference in approach.

A pattern maker company (current employment 20):

> It's my home, I've never gone anywhere, I was trained here, my contacts are here, where else would I go? It takes me a while to catch on but once I take root I don't want to change. I like Michigan.

An electrical machinery and equipment company (current employment 1,100):

I come from Ohio. I came to Michigan with another company. When I thought I could see that the other company was going to fold, I started to develop this business, with the help and cooperation of a few fellow-workers. As we were still working with this company that had brought us to Michigan, the new business of course had to be in this state—and in this town.

One of Michigan's largest employers:

In locating plants that supply other plants, finding the minimum cost location amounts to finding an optimum location with respect to the already existing plants this new plant will feed, and the location of the inputs necessary for the new plant's operations. The dominant factors determining the location of a plant such as this, then, would be costs of transportation to the plants it will supply and the availability of resources, modified by considerations of labor supply, labor costs, and the availability of very large sites at alternate locations. Marginal rate changes and changes in regulations affecting transportation costs, or any other costs for that matter, will naturally alter the optimality of any given plant's location. All we can do is to sit down and try to find the minimum cost location in the light of conditions as they are today and in consideration of whatever changes we can foresee in the future.

Often new companies which start on a small scale with limited resources seem to have little real choice in the matter of location. Potential new entrepreneurs undoubtedly are most numerous in the older, heavily industrialized areas. Local business relationships and the attraction of familiar places and friends seem to have a tendency to keep them in these areas. Thus the impact of nonpecuniary factors may well be in the direction of slowing down shifts in the geographic distribution of manufacturing activity. This conclusion is less pertinent for firms which start with substantial resources or have a subsidiary relationship to a large established company.

It also appears that an area may improve its chances of attracting newly created firms by being a desirable place to live for new entrepreneurs and management. For the small entrepreneur in particular, a location decision is a consumer (or household) as well as a business decision; that is, the preference function which is relevant includes consumer as well as business preferences. This does not mean merely that the appeal of a community to business is enhanced by climate and scenery (as in the case of California). Fourteen per cent of Michigan manufacturers rated community factors (housing, size of town, schools, recreation facilities) among the five most important locational factors. When asked to evaluate the relative importance of proximity to markets and materials on the one hand and "such things as good community relations, favorable industrial climate, good schools, or adequate recreation facilities" on the other hand, 26 per cent of manufacturers argued that these latter matters are more important and another 12 per cent argued that they are equally important. It appears here that some importance attaches to location factors which are "man-made," in the sense that they can be altered by the actions of government, business, labor, and community groups.

The Decision to Relocate

As firms grow older and expand, many remain at or near their original locations, even though these locations may have become far from ideal. It is at this point that concepts like Simon's "satisficing" entrepreneur [7], Boulding's homeostasis (maintenance of the balance of the organism) [8], and Katona's habitual behavior [9] become relevant for location theory. Besides the obvious financial cost of relocation, stability in plant locations results from inertia, from uncertainty, from personal attachments of owners and managers to a place, or from reluctance to disrupt tested ways of operating or established business connections. Manufacturing firms have important ties to other business firms—retail and wholesale customers, their suppliers, subcontractors, service establishments which perform auxiliary functions, machine tool shops, banks, legal and accounting firms. Moreover, 40 per cent of manufacturing output in the U. S. is absorbed as inputs by manufacturing itself, a figure which illustrates the importance of interfirm connections [10]. Firms are groups of people, and business connections have an element of personal co-operation which is strengthened by proximity and long-standing relationships.

The power of inertia and the forces making for stability are evident in the Michigan data. Although there is widespread dissatisfaction with conditions in Michigan, manufacturers accounting for only 8 per cent of employment in sampled industries were thinking of relocating their plants in the next few years. Michigan manufacturers who had no relocation plans were asked: "If you could start from scratch again with this plant, do you think you would locate where you are now or somewhere else?" About 40 per cent of executives replied that they would prefer to be located in another state and named a specific state or region. In Ohio, where some interviews were also taken, the feeling that the present location is not optimal was expressed by a somewhat smaller, but still substantial, proportion of manufacturers.

Those few manufacturers who did indicate that there was a possibility of relocation were asked what advantages would be offered by the new location being considered. The first column of Table 3 shows that cost factors were mentioned far more frequently than market considerations. Lower labor costs, in particular, were often cited as a reason for preferring another location. Tax considerations ranked second in Michigan, and market factors were a close third.

The emphasis on cost factors in connection with relocation decisions is clarified when relocation plans are related to recent growth of the firm. The proportion of manufacturers with plans to relocate all or part

TABLE 3

REASONS GIVEN BY MICHIGAN MANUFACTURERS FOR POSSIBLE RELOCATION OR EXPANSION AT NEW LOCATIONS

(Percentage of Employment Represented)

Cited as advantages of possible new locations‡	Among Michigan Firms Considering Relocation	Among Michigan Firms Considering Expansion
Labor costs, unionism	32%	23%
Taxes	20	8
Lower costs—not specific	4	3
Proximity to customers, marketing facilities	18	49
Availability of plant site, local concessions	10	10
Proximity to materials	*	2
Industrial climate	3	1
Labor supply	2	*
Other	3	14
Total	†	†

* Less than ½ per cent.

† Total differs from 100 per cent because some respondents mentioned several advantages, while others (having no specific location in mind as yet) did not mention any.

‡ These questions were asked of 23 per cent of Michigan manufacturers who said that they definitely, probably, or possibly might relocate and of 29 per cent who said they would or might expand in other areas.

of their operations out of the state of Michigan is 14 per cent among those plants which experienced a decline in employment of at least 10 per cent over the past ten years; but it is only 5 per cent among plants with stationary employment and 4 per cent among plants with increases in employment of at least 10 per cent and/or increases in sales of at least 40 per cent.

The survey also shows a clear association between relocation plans and the attitude scale which measures degree of satisfaction or dissatisfaction with a Michigan location. Plans to relocate all or part of operations out of state are more frequent among those with the least favorable attitudes (11 per cent) than among those in the midrange category (8 per cent) or those with the most favorable attitudes (2 per cent). It should be stated here that unfavorable attitudes in Michigan relate primarily to cost factors: labor, taxes, and the state's legal climate.

Among the firms planning to relocate, there are of course a few with satisfactory sales trends and favorable attitudes toward a Michigan location; a change in product, market, or manufacturing process or costs may have prompted the plan to move in those cases. On the other hand, many managements which are highly critical of developments in Michigan have no thought of relocating their plant. Unfavorable attitudes seem to become decisive when established methods of operation no longer produce satisfactory results; for example, when the firm is experiencing falling profit margins, persistently declining sales, or increasing competition. Faced with the necessity of taking some action, an out-of-state move to a (supposedly) low-cost location becomes an alternative that might not have been considered in a more favorable climate of opinion.

Location Decisions in Connection with Expansion

New capital investment by established firms constitutes a major source of flexibility in location patterns. When growth in business leads to the need for expansion, a genuine choice of location is required, unless the contemplated addition to facilities is small or important indivisibilities exist. In contrast to relocation, which may not be consciously considered unless serious problems develop, when a location is selected for new facilities, the forces of inertia are relatively weak. The advantages of having the new facilities close-by will then be weighed carefully against the cost and marketing advantages of more distant locations. Where a new plant is to be opened or where capacity could be added at alternative branch plants located in different places, the firm planning expansion clearly has more latitude in its choice of location than small new plants or plants already in operation.

Sometimes expansion and relocation are jointly considered. Expansion elsewhere, if successful, may be the first step toward relocation. Or relocation may facilitate expansion. In these cases, expansion serves to bring the location problem to the fore and makes for greater latitude of choice.

The quantitative importance of location decisions in connection with expansion is illustrated by the 1961 data for Michigan. While manufacturers accounting for only 8 per cent of employment in sampled industries are considering relocation, 46 per cent are planning additions to plant or equipment during the next five years or so. This group consists of 18 per cent who have plans to expand in-state only and 28 per cent who have plans to expand wholly or partly out of state. (It might be worth mentioning here again that the Big Three are not included in these figures.)

The survey shows that factors which govern choice of location differ between relocation and expansion decisions. In contrast to plans to relocate, which are strongly influenced by changes affecting cost of production, plans to expand at new locations seem to be dominated by considerations of demand and efficient marketing. Obviously a great many factors are involved in both kinds of decisions, and this distinction is not always clear cut. The second column of Table 3 shows that by far the most frequently mentioned advantage of the contemplated location, cited by nearly half of those considering expansion in other areas, is proximity to markets and customers. Labor costs—the next most frequent consideration—were referred to with less than half the frequency of market factors.

The role of geographic decentralization in connection with expansion decisions is particularly clear in the case of the Michigan economy. Decentralization of the automobile industry has been progressing over several decades. More generally, Perloff and his colleagues have shown that the Manufacturing Belt, extending from the Middle and North Atlantic States to Illinois and Indiana, is experiencing a gradual decline in its share of the metal-fabricating industries. As the national market grows, and as areas in the Far West, Southwest, and South become increasingly industrialized, plants closer to these markets can realize the necessary internal economies of scale as well as external economies of agglomeration [10]. The importance of geographic decentralization is illustrated by the following figures for Michigan: 31 per cent of manufacturing employment outside the Big Three is accounted for by one-plant firms, 11 per cent by multiplant firms operating in Michigan only, and 58 per cent by firms operating one or more plants outside the state.

When the balance between in-state and out-of-state expansion plans is analyzed by characteristics of firms and plants, it appears that the ratio of out-of-state expansion plans is highest among firms serving regional or national markets, among the larger firms, and among firms which already have plants in more than one state. For the latter group, out-of-state expansion does not constitute a radical departure from current methods of operation.

Perloff has presented data which indicate that manufacturing activity has a much greater association with population (i.e., terminal markets) than with resource locations, even for the first stage resource users [10]. When market oriented firms consider expansion possibilities, their thinking seems to be dominated by the desire to realize the advantages of proximity to customers. Plans, as measured in this study, often relate to a period two to three years ahead and have an element of uncertainty. At this planning stage *no* visible relationship emerges between expressed attitudes of manufacturers and the pattern of planned in-state versus out-of-state expansion.

At the actual point of deciding where to expand, the situation seems to be different. Table 4 indicates that at this later stage attitudes do exert at least a marginal influence on the choice of location. Those manufacturers with the most critical attitudes reported less in-state expansion in the recent past and more out-of-state expansion than manufacturers with a more favorable opinion of a Michigan location. This finding establishes a link between attitudes and expansion decisions,

TABLE 4

Relation of Expansion During the Past Ten Years to Manufacturers' Attitudes Toward a Michigan Location

Percentage of Employment Represented by Michigan Manufacturers Who During the Past Ten Years:	All Michigan	Index of Current Attitudes Toward a Michigan Location		
		Least Favorable	Mid-range	Most Favorable
Expanded in-state only	36%	26%	39%	50%
Expanded both in-state and out-of-state	46	57	43	33
More in-state	*13*	*19*	*11*	*12*
About equally	*11*	*7*	*12*	*14*
More out-of-state	*22*	*31*	*20*	*7*
Did not expand	14	16	12	17
Do not know; not ascertained whether expanded	4	1	6	*
Total	100%	100%	100%	100%

* Less than ½ per cent.

since we may assume that relative positions of manufacturers along the attitude scale have changed only slowly over time. In marginal cases, where two (or several) alternative locations may be almost equally satisfactory, attitudes seem to be influential, at the actual point of decision, in making one or the other location appear more attractive.

Conclusions

In conclusion, it is interesting to explore some of the policy implications of the findings presented, although further research is needed to corroborate the inferences drawn. The analysis points to a variety of stabilizing influences on location patterns: inertia, the importance of established business connections, the attraction of familiar places and people, the costs and uncertainties of relocation, and the multiplicity of important locational factors (so that a deterioration of one may be balanced by the favorable influence of another).

Shifts in location patterns seem to receive their chief impetus from expansion of facilities. Such changes may be reinforced by the location decisions of newly founded firms, but small new entrepreneurs often have to stay close to "home" and historical accident may play a large role in their location (the origin of the automobile industry in Michigan is a case in point). Relocations occur infrequently, and when they do occur, it is often in response to a decline in sales or profits. Relocations will benefit relatively low-cost locations, especially areas which are seen as having low labor costs.

Location decisions related to expansion are oriented to an important extent toward growing final and intermediate markets. Of course, the frequency and size of expansion projects depends on the rate of growth of the economy. Because of the interest of expanding firms in proximity to new customers and markets, a high rate of growth for the economy as a whole may entail very uneven growth rates for manufacturing activity in various regions and localities, accelerating incipient shifts. This implies that some of the older centers of industrial activity and the depressed areas cannot rely on the upward movement of the national economy as a whole to solve their unemployment problems.

Yet this conclusion does not mean that these older industrial areas are inevitably doomed to a decline in manufacturing activity. The survey clearly demonstrates that location decisions are governed only partly by the distribution of economic resources and population. To be sure, cost and demand factors exclude certain locations from the list of possible alternatives, but they seem to leave many firms with a considerable range of choice. Within that range, location decisions reflect in part historical accident, in part they are governed by locational factors which are "man-made" and can be altered. These include community factors such as housing, schools, and recreational facilities. They also include feelings of satisfaction and dissatisfaction on the part of business executives with labor conditions, taxes, legal climate, and their evaluations of the industrial climate. Dissatisfaction with these matters often stems from lack of co-operation between labor, government, and business. It hardly needs to be pointed out that the economic growth of a state depends to an important extent on the innovation-mindedness of its businessmen—the energy which they apply to the development of new products, new markets, and channels of distribution, and new production processes. Finally, the study indicates that a community can improve its chances of interesting new firms in locating there by having suitable plant sites (or even plants) available[4] and by being able to provide new firms with detailed information on local conditions and resources.[5]

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[4] This factor also stood out in an early postwar interview study in New England [11].
[5] This last point is treated in more detail in [1] and [12].

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THE PREDICTIVE VALUE OF SURVEYS OF BUSINESS INTENTIONS

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Whatever knowledge we have about the future of the economy is derived from evidence on its history and its present state. Some of our information enters into theoretical relationships involving causes and their effects. By understanding how firms and consumers have reacted to certain situations and changes in the past and by quantifying these relations, we expect to predict their reactions in the future to present conditions and recently observed changes. These causal relationships have been the principal traditional concern of economists; they are the study of how the economy works. But the record also gives us some information about the recent and current state of the economy which does not fit into these causal patterns. The new orders and commitments of firms for capital goods are not a determinant of their spending. They are a reflection of decisions to spend. Similarly, investment intentions collected by surveys are symptomatic, and not causal, factors in the outlook.

A prediction of investment based on profits, liquidity, capacity utilization, and other variables that enter into a firm's ability and incentives to invest is genuinely different from one that rests in part on new orders or capital spending intentions. There is a distinct preference among economists for the former kind of relationship. It explains as well as predicts; it relates investment activity to its fundamental causes rather than to their shadows. This preference can be supported on broader grounds than elegance and aesthetics. If the best explanation of investment behavior also provides the best forecasting technique, prediction and explanation need not be separate activities and no diffusion of the profession's resources is required. But it would be pure coincidence if the optimum path to explanation were also the best route to a forecast. If noncausal, symptomatic variables enhance our limited ability to predict, we are obliged to exploit the opportunity. To assess the opportunity, we are first required to determine the predictive value of noncausal series.

A variable has predictive value if it makes a positive contribution to the accuracy of forecasting as an addition to other available information. No survey datum needs to be considered as a potential substitute for anything else we know. Investment intentions data do not stop us from observing profits, sales, or excess capacity and including these in the raw materials used to forecast. The forecaster's tool kit should have plenty of room for both causal and noncausal variables.

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The Failure of Sales Expectations

The kit need not contain every recorded time series. Many measures of business expectations do not appear to have direct predictive value, although they have considerable theoretical interest to economists. In some instances, poor predictions can provide indirect assistance in prediction and hence do belong in the forecaster's tool kit. Sales expectations are an interesting example: they do not have direct predictive value; but they are of analytical interest and can be used to improve investment forecasts. Though not everyone would agree, I think the record contains persuasive evidence that sales expectations expressed by individual firms offer a poor forecast of economy-side sales —no better than a simple mechanical extrapolation of recent levels and not able to complement objective economic variables directly.

In January and February of each year, businessmen responding to the Commerce-SEC plant and equipment survey are asked for both their sales and investment expectations covering the full calendar year. While the investment intentions have clear predictive value, the sales expectations do not. The annual predictions of sales by manufacturers covering 1948-61 show no bias—they are as likely to be too high as too low, producing a mean underestimate over the entire period of less than 1 per cent. But the sales expectations have a wide dispersion around the realized sales level. The root-mean-square error of the forecasts is 6 per cent; it represents some improvement over a naïve trend projection of last year's sales, since the actual changes in annual sales have a standard deviation of 8 per cent. But the full-year sales expectations are surpassed in accuracy by a simple extrapolation of the sales level of January (seasonally adjusted). The January sales level predicts better than the firms' expectations for ten out of the fourteen years, and its average absolute error is 4 per cent as compared with 5 per cent for the manufacturers' expectations. According to these observations, the recent data on manufacturers' sales in the statistical tables of the March *Survey of Current Business* have more predictive value than the manufacturers' own sales expectations recorded in the same issue.

It would be easy to assemble a list of results where businessmen score low grades collectively as sales forecasters. I always find such results remarkable in the light of appealing analytical reasons why a collection of the sales expectations registered by individual firms should have predictive value. Firms should be expected individually to have some "feel" of their markets, even though they cannot control their sales volume. In addition, they use substantial resources in systematic attempts to forecast demand. Is there no return to their experience and expenditure? Has the officer of a firm no information to offer on its sales prospects for a year ahead? The individual firm ought to be able to predict its own sales. And, if the sales expectation of the firm is at all superior to a pure guess, proper enforcement of the law of large numbers ought to produce well-behaved sales forecasts in the aggregate. Even if an individual firm can estimate sales only within 20 per cent, twenty-five firms of equal size with independent errors would be expected to pull the aggregate error down to 4 per cent, and four hundred would reduce it to 1 per cent. Even when the example is discounted for the unequal sizes of firms and for positively related errors, the hypothetical results remain impressive.

This analytical argument has a rather obvious shortcoming: its conclusion does not check with the facts. It seems to go astray because of the exceedingly close positive relationship among errors made by individual firms in a given year, despite the fact that they are independently forecasting their own sales. One possible explanation is that each firm, explicitly or implicitly, approaches its sales forecast through a general appraisal of the over-all economic outlook. To be specific, suppose the individual sales forecast is derived by multiplying an estimated market-share by an estimate of the dollar value of the economy-wide market. Then, to the extent that firms are able to diagnose shifts in market-shares in advance, their individual expectations have predictive value at a microeconomic level. Firms that expect increases in sales would be more likely to experience gains than their less optimistic competitors. But this source of forecasting success for the firm makes no contribution to accuracy in the aggregate. Knowing the probable percentage sharing of a sales-pie among firms does not help to determine the likely size of the pie. Under these assumptions, when economists add up sales forecasts of individual firms, their totals are simply a weighted average of the general business outlook of businessmen where the estimated market-shares are the weights. The aggregated sales prediction would then be no better than the economy-wide forecasts that underlie them. And businessmen may collectively assign to themselves more or less than the whole pie. In that event, with the summed weights differing substantially from unity, the aggregated sales expectations would probably be poorer than the average general business forecast expressed by the same firms. The failure of sales expectations as forecasting devices might be attributable to such a process, but, in my opinion, it remains an intriguing puzzle.

Sales expectations might also be expected to display predictive value for another reason. To the extent that sales expectations influence production, employment, and investment decisions, these expectations would have a self-justifying tendency. Any time businessmen were particularly optimistic as a group, their individual actions would buoy up the economy and tend to realize their bullish sentiments. In this view, aggregated sales forecasts would display accuracy, not because businessmen are talented in forecasting, but because firms collectively control their destinies. Entrepreneurial behavior of this type is portrayed in theoretical literature. Also, in the financial press, the sales forecast is taken as a measure of confidence, and confidence is viewed as an autonomous determinant of the path of the economy. The negative findings on the predictive value of aggregated sales forecasts are not decisive evidence, but they do call for some explanation from proponents of these views.

The economist derives some interesting questions and lessons from sales expectations, even though they offer him no direct assistance in forecasting. To see the contributions of survey data which do have predictive value, I turn to the record of investment intentions.

The Success of Investment Intentions

The investment anticipations reported annually in the Commerce-SEC survey have an impressive record of predictive accuracy. For all industries combined, the deviations between actual and planned capital expenditures have averaged 3 per cent in absolute terms for 1948-61 in contrast with the 9 per cent average absolute annual percentage change in expenditures. I know of no naïve model and no "causal" explanation resting on predetermined variables which rivals the anticipations data in accuracy.

The success of the investment intentions is achieved because the large errors made by individual firms shrink in the aggregation process; here, the microeconomic deviations do display a considerable degree of independence. Investment plans came out so well in the total, not because each firm's intentions are fixed and rigid, but because the departures made by individual firms are likely to go in opposite directions. Nevertheless, there are systematic forces producing departures from plans that affect most firms in the same direction. These stem principally from surprises in the course of the economy. The outstanding example occurred when the Korean war broke out: plant and equipment investment in 1950 rose 2 per cent over 1949, in sharp contrast to the planned 11 per cent decline.

The dependence of investment realizations on developments in the economy is most readily observed for manufacturing industry in the relation between percentage deviations of actual from planned investment, on the one hand, and percentage errors in sales expectations, on the other. Generally when sales differ from expectations, investment plans are revised in the same direction. Only in the strike-affected year of 1959 did sales and investment deviations have opposite signs. Bringing the record up to date, I can report that nearly 80 per cent of the variance in the percentage investment deviations for 1948-61 is explained by a linear regression using percentage sales forecast errors as the independent variable. Each 1 per cent deviation in sales is associated with an expected 1.1 per cent revision of investment from plans. I might add that, to my knowledge, no *ex post* measure explains the investment deviations as well as that employing the sales expectations.

Here, the sales expectations reveal the demand assumptions underlying investment intentions and therefore provide indirect assistance in forecasting capital outlays. By collecting both investment and sales anticipations, the survey data hand us a point on an implicit schedule relating prospective capital outlays to the strength of demand in the year ahead. The historical evidence on investment revisions and sales surprises provides some notion of the shape and slope of that schedule. From his analysis of the rest of the economy, the economic forecaster can relate the strength of total demand to the level of the investment schedule. Putting these two parts together, he can use the survey data on sales to make an *ex ante* adjustment on the investment intentions, in effect substituting his own forecast of sales in place of the expectations of the businessmen.

These findings also relate to the influence of business optimism on economic activity. Given the level of investment intentions, optimistic sales expectations must be viewed as an unfavorable factor for capital outlays. The same volume of capital spending plans with lower expected sales means a higher investment demand schedule. Nevertheless, insofar as the sales expectations had an original influence on the investment plans, they still probably have a positive effect on the capital outlays of the year. Excessive optimism about demand tends to come out in the wash, but there is some indication that incorrect expectations retain their influence in part for a considerable time. According to the percentage changes estimated above, a billion dollar sales-surprise for manufacturers alters capital spending by only about 50 million dollars within the same year. A substantial amount of adjustment must be left for future periods.

The annual Commerce-SEC survey is augmented by quarterly surveys for the rest of the year. In these, near the beginning of a quarter, firms report on their anticipated capital outlays for the current quarter and for the next quarter. The first anticipation thus keeps the forecaster six months ahead of available actual data. It still means that as of now no Commerce-SEC anticipations have been reported beyond the first quarter of 1962. It would be very helpful if the plant and equipment survey could keep us briefed over four quarters ahead throughout the year, but the annual planning practices of firms seem to preclude that possibility.

Over the very short-term horizon they cover, the first anticipations are invaluable aids to forecasting. Thanks to the assistance of Richard Attiyeh, I can offer empirical findings on this matter. They employ first anticipations as predictors of quarterly plant and equipment outlays for 48 quarters from 1949-III to 1961-II.

First anticipations (A) explain nearly 97 per cent of the variance of predicted quarterly plant and equipment outlays (I) and yield a standard error of 0.95 billion dollars (at annual rates). The least squares regression estimate of I on A has a small positive intercept and a slope slightly below unity:

$$I = 1.90 + \underset{(.024)}{.923}A \quad \text{(in billions of dollars)}$$

While no sales expectations are available in the quarterly survey, one can still find a systematic pattern of plan revision related to developments between the time of the survey and the period of the outlays. The predictive value of the first anticipations is significantly enhanced by the addition of another variable, either the change in corporate profits (ΔP) or the change in gross national product (ΔY) in the intervening quarter. The standard error of estimate declines to 0.85 billion dollars for either of the following equations:

$$a)\ I = 1.35 + \underset{(.022)}{.929}A + \underset{(.020)}{.070}\Delta Y_{-1}$$

$$b)\ I = 1.35 + \underset{(.022)}{.940}A + \underset{(.044)}{.163}\Delta P_{-1}$$

No causal explanation I have unearthed matches the equations above. After a shameless amount of data mining, my best candidate explains capital outlays with GNP, a measure of liquidity flow, and a variable representing excess capacity. The liquidity flow measure (L) is corporate profits after tax plus corporate capital consumption allowances. It fits better than profits alone. Excess capacity (X) is measured by GNP times the excess of the unemployment rate over 4 per cent. While the dollar output gap will be a multiple of this magnitude because of cyclical conformity of productivity and labor force participation, the regression results do not require such an adjustment. The unemployment measure of excess capacity fits slightly better than measures constructed from a trend calculation of potential output or from direct calculations of capital utilization. All the explanatory variables are lagged one quarter, again because they fit best that way. With all of this explanatory artillery, the equation below has a coefficient of determination of 92 per cent and a standard error of 1.52 billion dollars and is thus considerably inferior to the estimation using the anticipations series:

$$I = 1.13 + \underset{(.008)}{.051Y_{-1}} - \underset{(.046)}{.341X_{-1}} + \underset{(.075)}{.249L_{-1}}$$

Instead of and in addition to the investment intentions data, I have tried the "new investment orders and contracts" series (Series 10 in the Census Bureau's *Business Cycle Developments*). Since the lead-time of this series is not obvious, I have employed lags of one- to three-quarters. Taken alone, it does not nearly match the first anticipations series; taken with the anticipations, the new orders series does not add significantly to the accuracy of the explanation. None of these findings bears on the value of new orders and contracts data for detecting cyclical turning points. But for a quantitative prediction of plant and equipment over the short horizon covered by the quarterly anticipations data, I cannot find any profitable use of the orders and contracts series. Other researchers may be able to show that this reflects my limitations and not those of the series in question.

Other Intentions Series and Additional Candidates

Any discussion of business intentions data can easily turn into a testimonal for the Commerce-SEC survey, with kind words for the extra assistance offered by the McGraw-Hill survey. The area of plant and equipment outlays is the only place where business intentions data have become solidly established as valuable forecasting tools. The new Commerce survey of manufacturers' inventory expectations shows some promise of lengthening the list. The August, 1961, *Survey of Current Business* presented a progress report on the accuracy of inventory forecasts made by firms over a six-month period. The raw survey results covering eight quarters were not encouraging but they took on a new and brighter look after corrections and adjustments were made. The manipulations applied to the data are plausible as well as ingenious, but their success in achieving predictive accuracy in future periods remains to be demonstrated. The inventory survey should not be judged by the same high standards of predictive accuracy established by fixed investment intentions.

Sales expectations are also collected in this survey to supply a bench mark for the inventory anticipations. While it is clear that unforeseen changes in sales will affect inventories, the probable quantitative effects, and even their direction, are not obvious. Over a very short period, larger sales will mean depleted stocks; over a sufficiently long period, unforeseen increments in sales will lead to a build-up of inventories to meet greater demand. The unsolved empirical problem is to translate these propositions into calendar time. Survey data may help to quantify the extent of flexibility and the speed of adjustment in inventories. The Commerce data suggest that unexpected gains in sales lead to reduced inventories relative to anticipations over a six-month period. But the evidence is fragmentary and the same pattern is not apparent over a three-month interval.

I believe that in some instances the inventory survey could be complemented by a direct survey of manufacturers' production plans. The inventory and sales expectations combined implicitly yield an approximate estimate of planned production. But the production schedule may be the key decision variable of the firm over a short horizon, and illuminating results might be obtained by requesting a direct forecast of production. Ward's offers a report on automobile production plans which has proved valuable for very short-term forecasting. I should judge that there are considerable opportunities for collecting such intentions data from other manufacturing industries. Homebuilding is another area where "production plans"—in the form of planned starts—might be profitably collected. Experimental efforts in this field have been encouraging. Our ability to predict residential construction might well be improved by a systematic and standardized quarterly survey of builders' plans.

Another challenge to the survey designer lies in the development of new lines of questioning. McGraw-Hill has been venturesome in devising questions on the purpose of new investment (expansion versus modernization) and on the rates of utilization of capacity. Economists might be stunned into silence by the overwhelming conceptual problems if they had to answer such questions; but the survey respondents calmly supply figures which produce a meaningful time series. More work with contingent questions might be profitable. I do not know whether firms can tell us how their capital outlays would be affected, for example, by an investment tax credit or changes in the tax regulations governing depreciation allowances, but such questions would be worth asking.

In conclusion, it seems safe to predict that economists will confront businessmen with old and new questions about their intentions and that the data thus collected will be valuable in forecasting economic activity and in understanding business decision making.

DISCUSSION

DANIEL H. BRILL: I must confess to approaching the topic of our session with prejudice. I view with traditional alarm the increasing proportion of our resources we are putting into asking businessmen and consumers what they are going to do, compared with the more limited efforts we are making to ascertain why they are doing it. I had always assumed that our profession should be at least as much concerned with the latter as with the former.

There would appear to be two major justifications in persisting in our efforts to solicit behavior intentions. First, if it works, i.e., if, in the aggregate, businessmen and consumers do predict their behavior correctly, we have a valuable tool for planning of public and private policies. Those of us who have to earn our daily bread practicing the dangerous art of short-term forecasting necessarily clutch at any clue to the future. We would still be using entrails of doves or sun spots if they worked, and we are all happy to use the somewhat less messy devices of anticipation surveys. Second, study of the causes of deviations from planned behavior may throw some light on the motivational wellsprings of business investment, consumer spending, saving, or other significant economic activities.

On the first, Okun makes it clear that anticipation surveys do work in the area of business investment. The record of accuracy is impressive. The usefulness of this accuracy to the forecaster, however, is somewhat less than the figures and Okun suggest. Consider the annual Commerce-SEC surveys to which Okun limited his analysis. These surveys, conducted in January and February, with the results generally available early in March, come far too late to assist in planning such major policy decisions as those going into the federal budget proposals for the subsequent fiscal year. The McGraw-Hill survey is available earlier, of course, but Mr. Okun has not subjected it to the same tests of predictive accuracy as those he applies to the government survey. Neither have I, but my impression is that it would score lower, as one might expect from a survey conducted some months before the beginning of the year rather than after the year has begun.

Moreover, the use of the annual anticipations figure is accompanied by continued uncertainty, as the forecaster confronted by subsequent quarterly surveys is torn between clinging to the annual total and deriving estimates for the balance of the year as a residual, or deserting the annual estimate and substituting a trend based on the current survey's estimates of last quarter's realizations and next quarter's anticipations, or gambling that last quarter's realizations will be revised the next time around and that it is safe to cling to both the earlier annual estimate and the current quarterly anticipation. Even with the survey, the forecaster still has a difficult job in reconciling his own intuition with someone else's data.

Turning to the second contribution anticipation surveys can make—helping us understand economic motivation—both Okun and Eisner find that deviations of actual investment behavior from announced intentions are in part explained by deviations in actual sales from those expected earlier. It is interesting that Eisner's calculations from cross-sectional data come so close to the figures derived by Okun from time series; namely, that a 1 per cent deviation between expected and actual yearly sales appears to be associated with a little more than 1 per cent deviation between planned and actual capital spending.

Accepting Eisner's postulates that both investment and investment plans are determined essentially by the same variables, and that differences between plans and realizations are reflections primarily of changes in the interim in the determining variables, then the results of his and Okun's investigations suggest that investment is determined primarily by businessmen's sales outlook and sales experience.

I suspect, however, that we are trapped into this conclusion by the kinds of statistics that are available. Eisner states earlier in his paper, "We regard investment demand as determined chiefly by expectations as to the profitability of investment." This is certainly my assumption about the process. Nevertheless, this is not the assumption that is tested, nor can it be, given the present scope of investment plan survey questions. Eisner has to resort to the device of using the actual change in profits as a measure of the changes in expected profits, and this in turn as a proxy for changes in the expected profitability of investment. This is obviously an unsatisfactory test of the profits variable.

One reason that leads me to suspect the validity of explaining investment in terms of sales expectations is that undoubtedly much investment is undertaken in an effort to offset expected cost increases, particularly as businessmen view the trend in labor costs, without necessarily envisaging an expansion in markets. If potential cost developments are important motivations, then perhaps we should expect to find negative coefficients on the lagged actual profits change variable, or at least not be surprised with small positive coefficients with large variances. This would still not be as satisfactory a test, of course, as would be direct answers on profits expectations comparable to those now obtained on sales.

Now where does this leave the state of the art? Satisfying or not with respect to structual explanations of economic behavior, the importance of intention surveys in short-run forecasting means that this type of statistical investigation will likely be with us for some time. We might as well improve them, therefore, and I heartily endorse the suggestion by Okun that new lines of questioning be developed that will permit relating of new variables to investment intentions.

I also suggest, however, that we devote some resources to surveys which attempt to go more directly to the "why's" of investment decisions. In this respect, I am encouraged by the Mueller-Morgan paper to feel that the interview technique is not a hopeless proposition. This is not to suggest that crude direct questioning will do the job nor that we have the sophistication yet to frame the appropriate indirect questioning. We may need, for example, to begin with more studies of the decision-making process in the firm. My

ECONOMIC BEHAVIOR OF FAMILIES

MICROANALYTIC MODELS OF THE UNITED STATES ECONOMY: NEED AND DEVELOPMENT*

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I. *An Accurate and Dynamic Model of the United States Economy Is Essential*

An accurate and dynamic model of our economy is needed to forewarn policy-makers of impending developments and to enable them to evaluate policies by trying these policies on the model before applying them to the economy.

The federal government exerts a major influence on the United States economy and will continue to do so as long as it spends and raises the enormous sums required for national security and for other essential activities. The fact that the federal government has the responsibility of controlling the money supply and must manage sizable assets and a large debt, only adds to the influence which it cannot avoid exerting. In addition, there are many other functions of the federal government which add to its influence on the domestic economy, not to mention its impact on the world economy.

The manner in which the federal government exercises its vast powers and the ends sought involve political and ethical questions, and its role could be increased, decreased, or altered in various ways. There are vital decisions to be made, and the welfare of the country depends heavily on how these decisions are made.

Forecasts about future developments have a direct relevance to policy formulation. The present situation is known only with a lag and instruments work only with a lag. Therefore, if policies are to be applied with optimum timing, policy-makers must be forewarned of impending developments. If we had a realistic dynamic model of the United States economy, it could be used to generate forecasts of future economic developments. The accuracy of forecasts obtained in this way would depend on how adequately the dynamic behavior of the economy was represented as well as on the assumptions made about outside events that impinge on the economy.

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Forecasting is sometimes done solely on the basis of such things as businessmen's intentions to invest or consumers' intentions to buy durables. Intentions of various components of our economy have a bearing on subsequent behavior, but there is nothing in our system which requires that intentions be mutually consistent. Accurate forecasting must take account of interactions and thus requires the use of a model of the economy.

Predictions derived from a realistic model of the economy are needed as a basis for selection of governmental policies relating to taxation, spending, debt management, etc. If policy-makers are considering one tax law as compared to some other tax law, or one spending policy as compared to some other spending policy, they should know what the consequences are of the policies under consideration. One way to find out would be to try out the policies on the economy, but it would not be very satisfactory from the standpoint of the participants. Policies should be selected on the basis of their fruit; but it would be preferable to sample the fruit before applying policies to the real world. If a sufficiently accurate model of the economy were available, it would make such sampling possible.

II. *Restriction to Macrocomponents and Macrorelations Is Highly Undesirable*

In seeking to model an economy, many economists have portrayed the observed activity as resulting from the behavior and interaction of a few macrocomponents such as the household, business, and government sectors or else of somewhat less aggregative components such as industries. Examples of models using major sectors as components include those constructed by Tinbergen, Colin Clark, Klein, Klein and Goldberger, Duesenberry, Eckstein and Fromm, Smithies, and Suits. Models of economic systems using industries as basic components stem from the work of Leontief.

Both of the above types of models use only macrocomponents as primary building blocks, and in both types the components behave and interact only according to relations between highly aggregated variables.

Restricting models of the economy to the use of macrocomponents and macrorelations is highly undesirable for the following reasons:

1. A great body of data is available relating to individuals, families, firms, and other microcomponents, but it cannot be used effectively in a disaggregated form in building, testing, or operating models of the economy. Microdata can be aggregated to yield macrodata. The fact

that it is impossible to deduce the microdata from the aggregated data proves that the aggregated data do not contain all of the information present in the data about the microcomponents. By considering the variance of cross-sectional observations on any of a large number of microvariables, it can be seen that the loss of information in aggregation is substantial. This does not in itself prove that the information lost could be helpful in prediction. However, given what is known about the nonlinearity of response of microcomponents to stimuli, it seems fairly certain that the microdata not only contain a substantial amount of information now lost in aggregation, but that some of the information lost could be highly useful.

2. A substantial part of theory and of the output of current research cannot be applied effectively in models restricted to macrocomponents and macrorelations. Much of our theory and research relates to the behavior of individuals, families, and firms. However, while it is a simple matter to aggregate actual behavior of microcomponents, we do not know how to aggregate microrelations appropriately.

3. Satisfactory testing of highly aggregative models cannot be achieved because of the relatively few macro time series observations available for testing implications of such models against actual developments. Multicollinearity, autocorrelation, feedbacks, and errors of observations only serve to complicate and worsen what is already a very precarious situation insofar as satisfactory testing is concerned. The information available for testing can be enormously increased by appropriate use of data relating to microcomponents.

4. Models built only in terms of the interaction of major sectors cannot yield several important kinds of predictions. For example, not only is it important to predict how unemployment or income would be affected by alternative policies, but it is also important to predict how unemployment and income would be distributed among individuals by various characteristics. Such characteristics might well include previous unemployment, age, sex, race, and family size.

III. *Technological Advances Make Feasible the Development of Microanalytic Models of the Economy*

During the last few years a new kind of economic model has emerged as a contender to the two types mentioned above. The single most distinguishing feature of the framework of this new type of model is that the behavior of an economy is represented as resulting in part from the behavior and interaction of microcomponents imbedded within macrocomponents. The components in this new type of model include markets, goods, and microcomponents such as individuals and families imbedded within regional household sectors and firms imbedded within industries. Models of this new type are called microanalytic models and are thought of as containing several hundred million microcomponents. In practice, such models are solved by computer simulations involving the use of samples of between 10,000 and 100,000 microcomponents.

The dream of a model of the economy which would serve to link effectively macrodevelopments to the behavior and interaction of microcomponents is very old, but until recently it has been unobtainable. The three following technological developments permit realization of this dream.

1. During the past few decades, sample survey techniques and data gathering organizations have developed rapidly. Data collection remains a weak point, but enough progress has been achieved to make feasible the collection of data needed for the estimation, testing, and use of microanalytic models.

2. Models of the economy must be based primarily on evidence gleaned from the innumerable unplanned experiments performed in the everday operation of the economy. Because of this, multivariate statistical techniques must be used to disentangle the separate influences of variables which an experimenter would have preferred to vary independently. The development of suitable statistical techniques has at least reached the minimum state of development required for building realistic models of the economy.

3. At present, microanalytic models can only be solved by simulation techniques. Solution by simulation techniques requires the use of very fast computers, and it is only within the last five to ten years that suitable computers have been in existence. With present computers, simulation of a full-scale microanalytic model would be feasible but difficult. Within five years the simulation of large-scale microanalytic models will have become a relatively routine matter because of computer and programming developments that are now taking place.

IV. *Terminological Framework of a Microanalytic Model of the Economy*

A model is a representation of aspects of the thing modeled. Models of economic systems that are intended for policy use represent the way in which a set of variables are thought to depend upon the prior values of other variables, including some which may be controllable. Such models thus embody a theory or a set of theories.

In using a model for policy guidance, it is useful to refer to those variables which are regarded as rather directly controllable by a policy-maker as "instrumental variables of that policy-maker." Variables which a given policy-maker might use in evaluating the success of any given policy are referred to as "criterion variables of that policy-maker" (or alternatively as goal variables or target variables of that policy-maker).

In discussing estimation problems it is useful to distinguish endogenous and exogenous variables. Variables generated by a model of an economy are called "endogenous variables of that model." Variables used in a model but given over time from outside of the model are referred to as "input variables of that model." If input variables are regarded as controllable by a given policy-maker, then they also are referred to as instrumental variables of that policy-maker. If an input variable of a model is regarded as influencing but not as being influenced by the endogenous variables of the model, it is called an "exogenous variable of the model." If a policy-maker sets a given input variable without reference to the system, then that input variable will be an exogenous variable as well as being an instrumental variable. If the policy-maker should now set that same input variable by reference to the value of some endogenous variable, then while the variable would still be an instrumental variable it would no longer be an exogenous variable.

Both for research purposes and for convenience of presentation, it is important and perhaps even essential to consider an over-all model of an economy as an ensemble of interacting building blocks. Each type of block becomes a focus of research activity, and presentation of the over-all model is facilitated by presentation of submodels of each type of block along with a description of the way in which interaction between blocks is to take place.

Alternative ways of breaking an over-all model into blocks are possible, but some ways seem definitely preferable. In general the objective is to select blocks in such a way that each block or type of block may be studied with a minimum of concern about interrelationships with other blocks.

The major building blocks are called "components." In microanalytic models of an economy the components represent recognizable entities met in everyday experience. The type of component occupying center stage is called a "decision unit." Decision units include such components as individuals, nuclear families, spending units, household units, manufacturing firms, retailers, banks, insurance companies, labor unions, and local, state, and federal government units. Individuals are regarded as imbedded within more extensive family or household units. Firms are thought of as being imbedded within industry units.

The decision units in microanalytic models interact with each other either directly or indirectly through a second major type of component called a "market." The markets in a model represent markets in the economy, and it is through them that the third type of component flows from decision unit to decision unit. For brevity, components of this last type will be referred to as "goods." But it must be noted that such components include money, bonds, shares of stock, deeds, mortgages, and various other things which may be produced, held, sold, bought, or consumed by decision units.

Variables used in the submodel of a component but given over time from outside of the component are referred to as "input variables for that component." Variables that flow from or are emitted by a component are called "output variables of that component." Variables that appear inside the submodel of a component are called "status variables of that component." If an input variable is stored and used in a subsequent time period by a component, then the stored variable would be referred to as a status variable of that component. If an input variable of a component is used unchanged by the component in the same time period during which it is received, then it is *not* referred to as a status variable of that component. Input, status, and output variables may refer to either stocks or flows, and of course all variables appearing in a dynamic model are dated.

A description of any component would include a listing of its own input, status, and output variables along with those relationships which are used in updating status variables and in generating output variables. The behavioral relationships used to generate values of the updated status variables and of the output variables, given the predetermined status variables and the input variables, are called "operating characteristics of that component." Other relations of a definitional or tautological character may be used as convenience dictates.

Operating characteristics are classified by the component in which they appear. However, just as it is useful to represent an over-all model of the economy as an interaction of major building blocks called "components," so also it is useful for purposes of research and presentation to group the operating characteristics of a single component into minor blocks which may be called "syndromes." A syndrome, therefore, is a group of operating characteristics within a component which for one reason or another seem so closely interrelated as to make it desirable to study them as a group rather than individually. For example, the several operating characteristics relating to the purchase and financing of an automobile might be grouped together as a syndrome.

Finally, any variables used by an operating characteristic may be referred to as an "input of that operating characteristic" and any variable determined by an operating characteristic may be referred to as an "output of that operating characteristic."

Let us now consider interactions between decision units. Some outputs of operating characteristics are end products and only require aggregation. Most outputs of operating characteristics, however, update status variables, and are directly used as inputs into other operating characteristics of the same component, and/or are outputs of the component. As will be recalled, the second major class of components in microanalytic models are markets and the specific function of these components is to transmit the outputs of decision units and to distribute them as inputs to other decision units.

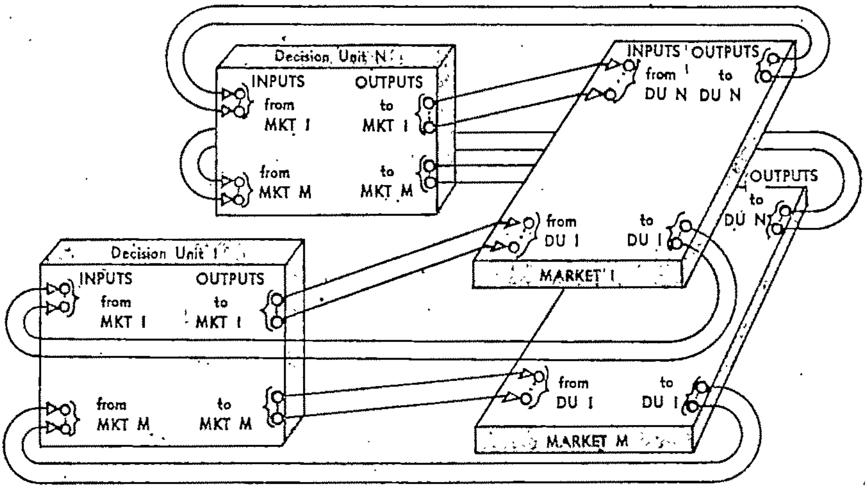
The information received by potential buyers is used as inputs into their operating characteristics, and in some cases orders to buy are the resulting outputs. These orders enter as inputs into the appropriate markets. Operating characteristics of each market summarize and classify the orders by region of origin, price accepted, etc. Other operating characteristics of the market then use this summarized information about orders, along with information about each potential seller considered in turn, to distribute the orders among potential sellers. Decision units respond to the orders which they receive as inputs and generate various outputs among which in due course will usually be deliveries. These deliveries show up as inputs into an appropriate market, are transmitted and distributed by the market, appear as outputs of the market and as inputs into the appropriate decision units. These decision units then make payments or promises to pay which are again distributed through the market to the appropriate sellers.

The accompanying incomplete flow diagram of an economic system shows graphically how the outputs of an entire set of N decision units may be visualized as transmitted and distributed by the M markets. The outputs of the decision units become inputs into the markets. After being summarized and distributed they appear as outputs of the markets. These market outputs then become inputs into the decision units again.

V. *Development of a Research Model of the Household Sector*

In *Microanalysis of Socioeconomic Systems: A Simulation Study*, published by Harpers in 1961, Orcutt, Greenberger, Korbel, and Rivlin presented a microanalytic demographic model of the United States and demonstrated the feasibility of solving such models by simulation techniques.

Another major step towards the achievement of a full-scale, realistic microanalytic model of the U.S. economy is the development, by the Social Systems Research Institute of the University of Wisconsin, of a research model of the household sector. Some of the work on this model is described by Arthur Goldberger and Maw Lin Lee in the following paper.



INCOMPLETE FLOW DIAGRAM OF AN ECONOMIC SYSTEM

The research model under development is expected to fulfill the following functions:

1. Provide a convenient framework for the storage and use of microdata about individuals, nuclear families, spending units, household units, and extended families.
2. Facilitate estimation and testing of operating characteristics as well as stimulate development of more appropriate techniques of estimation and testing.
3. Facilitate development and testing of simulation techniques as well as stimulate development of computer equipment and programming systems.
4. Assist in the direction of future research and data collection effort.
5. Stimulate development of dynamic maximization techniques as well as serve as a pilot version of a model designed to aid policy-makers.

Data and theories about behavior in the household sector relate to individuals, married couples, nuclear families, spending units, and household units as well as to larger aggregates of such units. In order to facilitate use of available data and comparison and testing of alternative operating characteristics, the research model under development will include all of these basic components.

In order to permit solution by simulation techniques on available computers, the number of individuals in the model will be restricted to about 100,000. These individuals will be imbedded within nuclear families. The nuclear families will be imbedded within spending units, and so on. The components within the model will be regarded as a probability sample of microcomponents in the household sector of the economy, and the initial values of status variables will be assigned in the proportions in which the corresponding characteristics appear in components of the real economy.

Simulation of the household sector model will proceed month by month. Within each month it will proceed household unit by household unit. Within each household unit it will proceed operating characteristic by operating characteristic for each individual, for each nuclear family, for each spending unit, and for the entire household unit.

All operating characteristics will be stored in high speed storage and called into operation as required. The status variables specific to individual households, or to their subcomponents, will be stored on a magnetic tape. The data relating to each household and its subcomponents will be read into the computer each month, and an updated set of the values of these status variables will be generated and written on a second tape.

When each output for each unit has been obtained, the first "pass" or month is complete. The second month is entered with a population of units which is different both in size and composition from the initial one. Some individuals have died or married, some babies have been born, some households have been formed or dissolved, many components have altered their asset and debt positions, and so forth. The whole procedure is then repeated for the second month and for as many more as desired. Prediction of macrovariables is obtained by keeping a continuous register of each kind of event and by taking a periodic census of the microcomponents.

In order to facilitate comparison and testing, provision will be made for incorporation of alternative operating characteristics. Such alternatives may operate within identical microcomponents, but this will not be required. As far as the organization of the research model is concerned even operating characteristics of macrocomponents may be included.

The variables used as inputs for the household sector will include such things as prices, credit terms, and household sector income and employment by geographical and other classification. Income and employment will be distributed to individual components on the basis of such characteristics as past incomes, age, sex, education, and family status.

VI. *Data Requirements for Development and Use of Microanalytic Models*

A primary requirement is that data collection should be responsive to research requirements. Hypotheses should be formulated; data appropriate for testing must be collected and evaluated; hypotheses should then be modified or new hypotheses introduced; data appropriate for testing these hypotheses must be obtained; and so on. This continual cycle of hypothesis formation and testing is common to all scientific research and demands data collection instruments which are highly responsive and which give priority to research needs.

Since planned experimentation is often out of the question, the social scientist needs to seek knowledge by making efficient use of the innumerable unplanned experiments which are continually being conducted by the everyday operation of our economy and of other economies. The social scientist should search for situations in which possible explanatory variables vary in somewhat the same way he would have chosen to vary them in a planned experiment. For each component studied, the variations of each of these possible explanatory variables should be measured if possible, and the behavior or apparent response of the component must be observed. The response, if any, is likely to follow the stimuli only after a lapse of time. Therefore, observations on identical components at several successive points in time are highly desirable. Many variables may affect the behavior of a component. In a planned experiment it might be possible to hold most of these constant and to vary only one or two of the possible explanatory variables at a time. In an unplanned experiment many of the possible explanatory variables vary continuously. To find the significant variables and the causal structure requires that co-ordinated measurements be made on all of the possible explanatory variables and on the one or more dependent variables. Then multivariate statistical techniques must be applied to distinguish the independent role of each variable. To have a reasonable chance of success the social scientist needs to specify which components are to be studied and which variables are to be measured, at which points in time.

One reason for the limited usefulness of data made available by the federal government is that these data are collected, processed, and made available in such a way that almost all connection is lost with households and firms identifiable over time. Instead, aggregate figures are sought and these are pieced together from many sources. Accurate measures may be obtained of aggregate income and of aggregate consumption expenditures classified by type of good. But there is no way of using these data to test hypotheses about the relation of household consumption expenditures to household incomes except by incorrectly assuming that all households are homogeneous in their response to income.

If one wishes to test hypotheses about the influence on consumption of children, existing stock of durables, debts, monetary assets, home ownership, income change, interval since marriage, attitudes, intentions, expectations, location, age, retirement, social background and

Pennsylvania, 1960). The following comments were based upon a survey of that catalogue.

What is apparent from the survey is the wealth of operating characteristics available from past and current econometric research on household units. We do not contend that all that remains to be done is to slap the operating characteristics together into a model; considerable work is required to ensure consistency in splicing together these estimated relationships. Annual results must be converted to the monthly basis utilized in the model. This work should not be viewed as distortion of the estimated relationships, but rather as an attempt to fit them into an integrated model within which their full predictive power can be realized.

Also made apparent from this brief catalogue are blind spots in our picture of the household sector. For example, rather little is available on the determinants of occupation, education, and location of residence. Since our model will be utilizing occupation, education, and location of residence as inputs, we require some means of generating these characteristics of the units. A possible stopgap device is to utilize past trends in the marginal distribution of these characteristics to project future trends. Individual units would be assigned these characteristics randomly, or rather in accordance with a few obvious determinants (parent's occupation and education), so that the marginal distribution of these characteristics matches the projected trends.

Now, one cannot be content, permanently, with the estimated relationships for the outputs which they do generate. With a few exceptions, each of the operating characteristics has been estimated from a single cross section of units at a given point in time. Such a cross section typically provides little information on the past histories of the units which are, after all, important determinants of both current status and current behavior. Therefore, relationships estimated from the typical cross section contain ambiguous measures of the dependence of current outputs upon current status and inputs and have unnecessarily high unexplained variances. The attack upon this problem will be via more searching interviews and via continuing panel studies.

Another familiar fault of a single cross-section survey is that it suppresses the effect of the current environment—of "market variables" like prices, interest rates, national unemployment rates, which are constant (or taken to be constant) over the given cross section but which may be expected to vary over time, and to influence the development of individual behavior over time. An attack upon this problem will be via the study of successive cross sections in conjunction with time series of market variables. We now report on a study of this type in which we are currently engaged.

III. *Analysis of Successive Cross Sections*

Since 1946 the Surveys of Consumer Finance have collected data early in each year on the demographic characteristics, financial situation, major expenditures, and attitudes and expectations of a probability sample of United States households. Each year the sample consisted of some 3,000 spending units, and the responses were coded onto some 12 punch card decks. The 1949, 1953, 1958, and 1961 samples each include about 1,000 units interviewed in the preceding year; but essentially the basic decks of the 16 SCF's comprise a set of successive cross sections of household sector units.

The Social Systems Research Institute has now acquired a full duplicate set of basic decks of the SCF's. We plan to utilize this set of successive cross sections in investigations of the stability of the functional form and parameters of operating characteristics and of the impact of market variables. In a pilot study, we have restricted ourselves to two special decks prepared by Charles Lininger, of the Survey Research Center, for each of the 1951-60 SCF's. These special decks, prepared for another purpose, are weak in asset and attitudinal data as compared with the full set of basic decks, but are quite strong in demographic, major expenditure, housing, and automobile data.

Our first step was to fit least squares regression relationships for each of the 10 SCF's 1951-60 (with exceptions where the data were not available) for each of the following 23 dependent variables: total income, home ownership (probability and value of owned home), monthly rent, expenditures on additions and repairs to house (probability and amount), car ownership (probability), new car ownership (probability), multiple car ownership (probability), purchase of car in prior year (probability, total price, and net outlay), purchase of new car in prior year (probability), purchase of household durables in prior year (probability and amount), mortgage indebtedness (probability, amount, and monthly payment), non-car installment indebtedness (probability, amount, and monthly payment), and debt incurred in connection with purchase of car in prior year (probability and amount). The form of the relationship for any of the dependent variables is the same for all years.

For illustrative purposes, we present here three of the sets of estimated relationships: for probability of purchase of durables, for amount spent on durable purchases (given durable purchases), and for probability of new car purchase (given car purchase). Definitions of variables and symbols are given in Table 1, and the regression coefficients along with associated statistics are given in Tables 2-4. It should be noted that the SCF dated year *t* refers to asset, debt, and demographic status as of early year *t*, and to income and expenditures

TABLE 1

Definition of Symbols

Variables				
Constant	a	$a=1$ for all observations.		
Income; income squared	Y; Y^2	Y=disposable income in 10^3 dollars. Y^2=square of Y=(disposable income squared) in 10^6 dollars.		
Age of head; age of head, squared	A; A^2	Age in years	A	A^2
		18–24	1	1
		25–34	2	4
		35–44	3	9
		45–54	4	16
		55–64	5	25
		64 and over	6	36
Sex of head	S	$S=1$ if female; $S=0$ if male.		
Race of head	R	$R=1$ if nonwhite; $R=0$ if white.		
Spending unit size	N	N=number of individuals in unit.		
Marital status of head	W	$W=1$ if unmarried; $W=0$ if married.		
Home ownership	H	$H=1$ if home owner; $H=0$ otherwise.		
Mortgage debt	M	M=mortgage debt in 10^3 dollars.		
Type of unit	U	$U=1$ if primary spending unit; $U=0$ if secondary spending unit.		
Recency of marriage of head	W_R	$W_R=1$ if married no more than two years; $W_R=0$ otherwise.		
Education of head	E_1	$E_1=1$ if attended high school but no college degree; $E_1=0$ otherwise.		
	E_2	$E_2=1$ if college degree; $E_2=0$ otherwise. ($E_1=E_2=0$ if did not attend high school.)		
Occupation of head	O_1	$O_1=1$ if professional, technical, or self-employed; $O_1=0$ otherwise.		
	O_2	$O_2=1$ if manager, official, or proprietor; $O_2=0$ otherwise.		
	O_3	$O_3=1$ if clerical, sales, skilled, or semiskilled; $O_3=0$ otherwise.		
	O_4	$O_4=1$ if unskilled, service, student or housewife; $O_4=0$ otherwise. ($O_1=O_2=O_3=O_4=0$ if unemployed or retired.)		
Durable purchases	D	D=expenditures on household durables in 10^3 dollars.		
Durable purchaser	D_1	$D_1=1$ if $D\neq 0$; $D_1=0$ otherwise.		
New car purchaser	K_{PN}	$K_{PN}=1$ if purchased new car(s); $K_{PN}=0$ otherwise.		
Unemployment rate	u	u=unemployment as per cent of civilian labor force, prior year.		
Price index	p	p=consumer price index (1947–49=100), prior year.		

Statistics	
R^2	Coefficient of multiple determination.
n	Number of observations.
s	Standard error of estimate.
$\bar{y}$	Mean of dependent variable.
ΔR^2	Increase in R^2 attributable to introduction of education and occupation variables.
δ_{Y5}	"Income effect": partial derivative of dependent variable with respect to disposable income evaluated at \$5,000 disposable income (i.e., at $Y=5$).
δ_{A3}	"Age effect": partial derivative of dependent variable with respect to age evaluated at the 35–44 age bracket (i.e., at $A=3$).
*	Coefficient exceeds, in absolute value, 1.960 its conventional standard error.
**	Coefficient exceeds, in absolute value, 2.576 its conventional standard error.

TABLE 2

D_1: PROBABILITY OF DURABLE PURCHASES

	SURVEY YEAR											
	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	Pooled	Extended
a	.2456**	Strictly comparable results not available	.3116**	.2820**	.2019**	.2817**	.2620**	.3366**	.2714**	.3196**	.3012**	.6558**
Y	.0502**		.0245**	.0169**	.0261**	.0149**	.0284**	.0193**	.0354**	.0274**	.0237**	.0247**
Y^2	−.0012**		−.0005**	−.0003*	−.0007**	−.0002	−.0004**	−.0003**	−.0008**	−.0006**	−.0004**	−.0004**
A	−.0168		−.0812**	−.0268	−.0139	−.0248	−.0234	−.0776**	−.0649*	−.0930**	−.0547**	−.0567**
A^2	−.0033		.0059**	−.0021	−.0038	−.0010	−.0030	.0066**	.0031	.0065	.0023*	.0026*
S	.0187		.0257	.0757*	.0607	.0504	.0516	.0863**	.0531	.0282	.0510**	.0503**
R	.0232		.0250	−.0420	.0006	−.0344	.0044	.0204	−.0027	−.0316	−.0081	−.0046
N	.0116		.0169*	.0238**	.0251**	.0065	.0032	.0182**	.0118	.0258**	.0168**	.0173**
W	−.1315**		−.0998**	−.1276**	−.0962**	−.1343**	−.1115**	−.1535**	−.1047**	−.0602	−.1236**	−.1183**
H	−.0309		−.0268	.0400	.0113	−.0188	−.0096	.0309	−.0318	.0308	.0002	−.0013
M	.0077*		.0065	.0019	−.0002	.0094**	.0039	.0034	.0023	.0033	.0038**	.0041**
U	.1703**		.1960**	.1514**	.1923**	.2171**	.1834**	.1090	.2067**	.1309**	.1687**	.1746**
W_E	.0299		.1488**	.1477**	.1076**	.1853**	.1705**	.1489**	.0961*	.1187**	.1288**	.1298**
u	—		—	—	—	—	—	—	—	—	—	.0045
p	—		—	—	—	—	—	—	—	—	—	−.0033**
R^2	.15		.10	.10	.10	.10	.11	.08	.11	.10	.10	.10
n	3026	2604	2869	2771	2906	2860	2854	2974	2932	2793	25982	25982
s	.458		.464	.469	.471	.470	.467	.474	.466	.467	.468	.468
$\bar{y}$	.4339	.4320	.3953	.4251	.4312	.4343	.4310	.4126	.4168	.4117	.4214	.4214
δ_{Y5}	.038	.020	.020	.014	.019	.013	.025	.016	.027	.021	.020	.020
δ_{A^2}	−.037	−.040	−.046	−.039	−.037	−.031	−.041	−.038	−.046	−.054	−.040	−.041

TABLE 3

D: DURABLE PURCHASES

	SURVEY YEAR											
	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	Pooled	Extended
a	.2054**	Strictly comparable results not available	.1768*	.1589	.2705**	.1697*	.2487**	.0407	.0620	.1604	.1944**	.4292**
Y	.0261**		.0387**	.0647**	.0354**	.0359**	.0359**	.0346**	.0515**	.0330**	.0379**	.0385**
Y^2	.0000		−.0004	−.0008**	−.0003	−.0004**	−.0003*	−.0003**	−.0011**	−.0003	−.0004**	−.0004**
A	.0009		−.0224	.0122	−.0056	−.0190	−.0105	−.0098	.0489	.0152	−.0076	−.0080
A^2	−.0029		.0010	−.0026	−.0002	−.0010	−.0003	.0016	−.0079	−.0039	−.0005	−.0004
S	−.0514		−.0715	−.0023	.0637	.0360	.0759	−.0297	−.0082	.0178	.0008	.0014
R	−.0110		−.0337	.1918**	.0291	.0275	.0308	.0127	.0236	.0348	.0293	.0324*
N	−.0222**		−.0106	−.0363**	−.0128	−.0025	−.0038	−.0145	−.0157	−.0188*	−.0146**	−.0140**
W	−.0070		.0419	−.0310	−.1030*	.0254	−.1065	.0385	.0244	−.0509	−.0221	−.0192
H	−.0030		−.0568	−.1368**	−.0402	.0034	−.0582	−.0086	−.0241	−.0228	−.0357**	−.0374**
M	.0079*		.0090	.0292**	.0145**	.0038	.0066	.0074*	.0010	.0091**	.0083**	.0087**
U	.1490**		.1438**	.1092	.0128	.1016	.0384	.1902	.0724	.0983	.0904**	.0946**
W_B	.1819**		.3054**	.1927**	.1890**	.0764	.1939**	.1787**	.1883**	.0230**	.1941**	.1938**
u	—		—	—	—	—	—	—	—	—	—	−.0114*
p	—		—	—	—	—	—	—	—	—	—	−.0016**
R^2	.15		.14	.16	.12	.11	.12	.09	.08	.13	.11	.11
n	1313	1125	1133	1178	1253	1242	1230	1227	1222	1150	10948	10948
s	.333		.411	.536	.386	.364	.430	.409	.416	.384	.412	.412
$\hat{y}$	.3818	.4185	.4017	.4514	.4018	.3887	.4317	.3901	.3846	.3980	.4030	.4030
δ_{Y6}	.026	.043	.035	.058	.032	.032	.033	.031	.041	.030	.034	.035
δ_{A3}	−.017	−.039	−.017	−.002	−.007	−.024	−.012	−.001	.001	−.008	−.010	−.011

TABLE 4

K_{PN}: PROBABILITY OF NEW CAR PURCHASES

	SURVEY YEAR											
	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	Pooled	Extended
a	−.0791	Strictly comparable results not available	−.0106	.0842	.0309	−.0864	−.0753	.1243	.1530	.0158	.0363	.8807**
Y	.0768**		.1049**	.0557**	.0623**	.0654**	.0543**	.0615**	.0770**	.0405**	.0561**	.0591**
Y^2	−.0016**		−.0029**	−.0008**	−.0013**	−.0010**	−.0008**	−.0010**	−.0019*	−.0001*	−.0009**	−.0010**
A	.1568**		.0466	.0736	.0621	.0817	.1248	.0533	.0552	.1071	.0828**	.0790**
A^2	−.0174*		−.0047	−.0111	−.0073	−.0087	−.0139	−.0052	−.0093	−.0104	−.0092**	−.0087**
S	.0373		.0016	.0594	.0526	−.0463	−.0218	.1772*	.0597	.1180	.0470	.0507
R	−.0874		−.0859	.0413	.0087	.1059	−.0489	.0676	−.0060	−.0427	−.0063	−.0009
N	−.0541**		−.0485**	−.0434**	−.0571**	−.0442**	−.0317*	−.0548**	−.0483**	−.0245*	−.0450**	−.0431**
W	.0149		.0512	−.0633	.0354	.0582	.0550	−.0801	−.0531	.0142	−.0063	.0024
H	.0748		.0082	.0451	.0978*	.1137**	.0673	.0645	.0878*	.1540**	.0828**	.0805**
M	−.0125		.0039	.0033	−.0079	−.0064	−.0084	.0011	−.0076	−.0144**	−.0074**	−.0061**
W_B	−.0385		−.0461	−.0636	−.1401	−.0001	−.0220	−.0817	−.0159	.1391	−.0315	−.0267
D_1	.0068		.0194	−.0456	−.0111	.0073	−.0281	.0016	−.0437	−.0462	−.0118	−.0147
E_1	.0976*		.0240	.0847	.0636	.1072**	.1032*	.0506	.0270	.0426	.0744**	.0754**
E_2	.1412**		.1040	.1610**	.1215*	.1383**	.1073	.0093	.0933	.1626**	.1237**	.1243**
O_1	.1126		.0591	.0941	.1039	.0381	.0054	.0412	−.0866	−.0945	.0513*	.0401
O_2	.0235		.0274	.0097	.1147	.1027	.0845	−.0375	−.1611*	−.0749	.0296	.0193
O_3	.0132		−.0703	.0044	.0057	.0496	−.0097	−.0537	−.1496*	−.0447	−.0084	−.0199
O_4	−.0944		−.0486	.0022	.0472	−.0270	−.0231	−.1329*	−.1761**	−.1589	−.0723**	−.0575*
u	—		—	—	—	—	—	—	—	—	—	−.0035
p	—		—	—	—	—	—	—	—	—	—	−.0072**
R^2	.27		.28	.20	.21	.24	.19	.21	.18	.16	.20	.21
n	750	581	615	651	722	840	732	691	647	673	6321	6321
s	.434		.416	.448	.435	.438	.450	.437	.423	.449	.440	.438
$\bar{y}$	.4853	.4596	.3740	.4240	.3753	.4464	.4249	.3835	.2998	.3759	.4017	.4017
ΔR^2	.024		.021	.019	.017	.013	.011	.014	.021	.027	.016	—
δ_{Y5}	.060	.074	.076	.047	.049	.055	.046	.051	.058	.034	.047	.050
δ_{A3}	.052	.039	.018	.007	.018	.030	.041	.022	−.001	.045	.028	.027

during year t-1. Observations were not adjusted for price changes, nor were they weighted to reflect differential sampling rates. Farm units were excluded throughout. Unfortunately, a computing error on our part prevents us from presenting strictly comparable results for 1952 at this time.

Briefly surveying each of the tables we find what we take to be an encouraging degree of stability of each of the regressions over time—stability with respect to sign, order of magnitude, and significance of the regression coefficients. For income and age, which enter nonlinearly, the intertemporal comparison is simplified by reference to the partial derivatives ∂_{Y5} and ∂_{A8} given at the bottom of the tables. For the record, each of the R^2's is significantly different from zero at the 1 per cent level by the conventional F-test. To illustrate the range of regressors being explored, the education and occupation variables are included in the regression for the probability of new car purchase (where their joint contribution is generally significantly different from zero at about the 5 per cent level by the conventional F-test), but excluded in the two durables regressions (where they fail the conventional test).

TABLE 5

ANNUAL REGRESSAND MEANS: OBSERVED AND PREDICTED FROM POOLED REGRESSIONS

Survey Year	Probability of Durable Purchases		Durable Purchases		Probability of New Car Purchases	
	Observed	Predicted	Observed	Predicted	Observed	Predicted
1951	.4339	.3937	.3818	.3742	.4853	.3875
1952	.4320	—	.4185	—	.4596	—
1953	.3953	.4012	.4017	.3842	.3740	.3811
1954	.4251	.4114	.4514	.3910	.4240	.4068
1955	.4312	.4206	.4018	.3902	.3753	.4010
1956	.4343	.4206	.3887	.4056	.4464	.4169
1957	.4310	.4374	.4317	.4314	.4249	.4172
1958	.4126	.4457	.3901	.4208	.3835	.4150
1959	.4168	.4249	.3846	.4089	.2998	.3736
1960	.4117	.4377	.3980	.4222	.3759	.4065

The second step was to combine all nine surveys (1951, 1953-60) together and to fit each regression to the pooled sample. The results of the pooled regressions are presented in the next to the last columns of Tables 2-4. A formal test of the hypothesis that the entire true regression relationship was constant for all years led to its rejection. (We have yet to formally test for stability of individual coefficients.) We have also applied the pooled regression coefficients to the annual means of the regressors to obtain a series of predicted means of the regressands. These series are presented along with the series of regressand means in Table 5. Comparison of the predicted and actual series indicates how well a single relationship is able to track the time path of the mean of the dependent variable (which may be associated with the corresponding national aggregate).

Turning finally to the impact of the market variables, we have extended the regression to include two new variables, u, the unemployment rate, and p, the consumer price index, and fitted to the pooled sample. The results of these extended regressions are presented in the last columns of Tables 2-4. We have also applied the extended regression coefficients to the annual means of the regressors to obtain a series of predicted means of the regressands; these are presented, along with their observed counterparts, in Table 6.

TABLE 6

ANNUAL REGRESSAND MEANS: OBSERVED AND PREDICTED FROM EXTENDED REGRESSIONS

Survey Year	PROBABILITY OF DURABLE PURCHASES		DURABLE PURCHASES		PROBABILITY OF NEW CAR PURCHASES	
	Observed	Predicted	Observed	Predicted	Observed	Predicted
1951........	.4339	.4394	.3818	.3878	.4853	.4737
1952........	.4320	—	.4185	—	.4596	—
1953........	.3953	.4020	.4017	.4059	.3740	.4006
1954........	.4251	.4085	.4514	.4136	.4240	.4212
1955........	.4312	.4288	.4018	.3816	.3753	.4041
1956........	.4343	.4246	.3887	.4113	.4464	.4257
1957........	.4310	.4351	.4317	.4369	.4249	.4198
1958........	.4126	.4312	.3901	.4189	.3835	.3913
1959........	.4168	.4101	.3846	.3729	.2998	.3151
1960........	.4117	.4139	.3980	.3996	.3759	.3450

IV. *Prospective Research*

The preceding section has indicated several lines of attack on the successive cross sections of the Surveys of Consumer Finance. On the basis of our experience in this pilot study, we will exploit the much larger set of data embodied in the full set of basic decks for the Surveys. The decennial censuses and the successive BLS Surveys of Consumer Expenditures—the 1960-61 one is now under way—are also amenable to this type of approach.

We will close by pointing out several fresh sources of panel data on which we propose to draw for refinements of operating characteristics. The distinctive features of panel data are that they permit one to utilize past histories of individuals and to isolate the effects of persistent interpersonal differences in behavior.

There is, first of all, the reinterview subsample of the 1960-61-62 Surveys of Consumer Finance, which constitutes a short-lived panel.

Some 1,000 spending units will be interviewed for the third successive year early in 1962. There is the Current Population Survey of the Bureau of the Census, which collects data monthly on a sample of some 35,000 households, with reinterviews of a part of the sample at regular intervals.

We will also be working with a sample of some 125,000 Wisconsin state income tax returns drawn by our colleague Roger Miller. Identical alphabetical clusters were drawn for each tax year 1947-59, and all tax returns on file in each cluster fall in the sample. To the extent that the same individuals appear repeatedly, these returns provide a retroactive panel with information on income by source, employment, capital transactions, and family histories and comprise an attractive basis for estimation of relationships on the dynamics of income, employment, and wealth. Finally, we note the Wisconsin Sample State-Wide of 1,000 residents, recently drawn by the Survey Research Laboratory of the University of Wisconsin. The first interviews on this multipurpose survey are now being taken. Such a sample may be continued as a rotating panel, with questions varying over time. A range of questions on demographic and economic behavior will be regularly included.

DISCUSSION

Robert Summers: Professor Samuelson in his presidential address spoke of the implications of the Archbishop of Canterbury's proclamation that God did or did not exist. Perhaps that story is relevant here as we see Professor Goldberger, a coauthor of the Klein-Goldberger aggregate model, in league with Professor Orcutt.

By now the Social Systems Research Institute at the University of Wisconsin is well known, and we have heard a great deal about the microanalytic model that is being developed there. These papers tell us a little more about the project's progress. It is only fair to say that the first big report on the project, *Microanalysis of Socioeconomic Systems*, contained almost all of what Professor Orcutt has had to say. Therefore, I will focus my attention on his last section in which he makes an appeal for substantial financial support.

He presents a persuasive case for the usefulness of a fully implemented model of the sort he has described. It would be hard to disagree with his contention that having such a model would be worth a great deal. I think, however, that there is room for a reasonable doubt about the prospect of achieving a full-scale operating model in anything like the near-term future, even under the favorable budgetary conditions he advocates. If I were sure the model could be implemented, I think I would consider it worth buying. But given my notion of the odds of success, I would be reluctant to invest the tremendous quantity of resources Professor Orcutt thinks would be necessary. The savings the economy might achieve with a successful model are indeed breathtaking, but there are lots of ways of saving large sums of money in a 525 billion dollar GNP economy where the federal budget is 90-odd billion. I am firmly of the view that there are many areas where the rate of return on the services of social scientists would be greater than that of the Wisconsin project when the actuarial risk of no-success is taken into account.

While 10 million dollars per year for ten years is only a trifling sum in comparison with present GNP, it is a tremendous amount in terms of our total current economic research effort and capability. Seventy-five million dollars would be a very liberal back-of-the-envelope estimate of our annual economic research capability. Professor Orcutt is asking us to spend on this project as much as a tenth of our total economic resources, in addition to the large sums he wants for data collection and computing. I might enjoy being on the receiving end of the inflation which surely would result in the labor market for econometricians if Professor Orcutt got his money. However, I certainly object to a national economic research portfolio displaying such inadequate diversification.

Why am I so bearish about the prospects of this avenue of research? I once thought the computing requirements of the model were too great. I now realize I was not thinking "big" enough. A budget of 10 million dollars altogether for computing may very well be adequate to the task. The IBM 7090 has replaced the IBM 704, and bigger and better computers are in prospect. If one of these supercomputers were available full time for a year or more, the job could be done. Furthermore, I think we have the statistical techniques available or around the corner which are necessary for all of the data analysis. But I am extremely skeptical about the feasibility of developing the many, many, *many* operating characteristics required by the model. The fineness of detail called for is just far beyond our abilities now and for a great many years to come. (Admittedly, even if the simulation model as a whole was never completed, those operating characteristics that were obtained would be a useful adjunct to our stock of empirical knowledge.)

In short, if I were the program officer of the philanthropic foundation this grant application was addressed to, I would say: "Very interesting. The potentialities are tremendous, but it has not yet been demonstrated that they can be realized. I will provide a little support now. When more of the numbers come in, I will consider providing more."

And now to Professor Goldberger's presentation of some of the numbers currently being generated. Without doubt, he is the champion regressor among economists. The use of 26,000 observations in a nineteen variable regression is surely a record. He is particularly to be commended for his investigation of the stability of his cross-section parameters over time. By and large, the parameters remained the same over the decade of the fifties, and even though the analysis of variance test showed the observed differences to be statistically significant, pooling the data is not unreasonable. It is to be hoped that the differences which exist can be reduced by including aggregate variables in the regressions. Professor Goldberger's efforts along these lines have not been remarkably successful so far, but presumably a more imaginative use of the price level (e.g., as a deflator) and incorporating variables like change-in-personal-income will provide some reduction in the unexplained variance of his regressions.

As usual in cross-section studies, the correlation coefficients in these regressions are all low and the standard errors of estimate are all large. The stochastic character of the microanalytic model simulations allows for the unexplained variance of the dependent variables as measured by the standard errors of estimate. The parameter estimates are subject to error too, however. Though they are not given in Professor Goldberger's paper, one can infer that the standard errors of the parameter estimates in many cases are of fair size from the asterisks appearing in Tables 2, 3, and 4. It is impossible to predict a priori how sensitive simulation results will be to variations in the parameter estimates. I hope sensitivity analysis will eventually be done to investigate this important matter.

While I appreciate the usefulness of Professor Goldberger's econometric research into household spending behavior, I see it as constituting only the most elementary of the tremendous number of building blocks required for the microanalytic model. I await with interest reports on the many remaining building blocks.

DANIEL B. SUITS: I so thoroughly endorse both these papers that little is left to do but to echo the claims and objectives and to paraphrase the exposition. It is fundamental that the task of science is to predict the outcome of a specified set of conditions. In this respect economics—or social science in general—is the same as physics. The difference lies in the nature of the material studied; physics has the overwhelming advantage of laboratory control over an experimental environment. The economist cannot explore theory by experimentation with a few variables under controlled conditions but must make all tests with data drawn from observation of an intricate system in full operation.

As a consequence, the scientific study of social phenomena is an expensive proposition, requiring costly surveys, compilations, and data processing. But it is expensive only in comparison with the cost of pure speculation, for high cost is an aspect of all modern science. Exploration—whether by antarctic expedition, 200-inch telescope, electron microscope, two-mile linear accelerator, or reinterview sample is a costly business, nor is it notably more so in one case than in another.

On the other hand, the pay-off from economic research is likely to be immensely greater. In referring to the speed of economic growth, the late Joseph Schumpeter often said that the reason automobiles can go so fast is that they have brakes. It is more to the present purpose that automoblies can go fast because they have headlights and steering wheels. Any kind of policy takes time to put into operation and to take effect. This social reflex time requires social forecasting in precisely the same way that safe driving demands ability to estimate road and traffic conditions several hundred feet ahead and to know how to apply the controls to adjust to the situation.

In a microanalytic model, operating characteristics must be approximated by algebraic or other simple functions, and it is here that the main statistical problems arise. The paper by Goldberger and Lee shows the nature of some of these so clearly as to obviate comment. The examples given, however, all represent operating characteristics derived from data contained in sample cross sections. Like aggregative models, these data have in their favor the strong argument of availability. Their limitations lie in the fact that unit to unit differences in a cross section reflect not only differences in inputs but differences in personality and other characteristics not all of which can be adequately allowed for in input variables.

The moving cross section is a superior source of data making it possible to follow the behavior of a given unit over time as well as to compare one unit with another. The data to be obtained from the Wisconsin income tax returns are of this kind, as are the data contained in the reinterview studies of the Survey Research Center. In a moving cross section observed values of inputs and outputs are expressed as X_{it}, Y_{it} indicating the value observed on the i-th unit during the t-th observation. By a technique developed at the Research Seminar in Quantitative Economics, operating characteristics are derivable from such data by a two-stage process. The characteristic is first expressed as a regression in the form

$$Y_{it} = a + bX_{it} + c_i + d_t$$

where the value of the c_i vary from unit to unit and are fixed over time, while the d_t are fixed for all units and vary from time to time.

The operating characteristic is completed by analysis of the c_i in terms of correlates of family status that are relatively fixed over time (region, social status, occupation, education, size, race, etc., including observed mean values $\overline{X}_i$) and analysis of the d_t by variables common to all families but varying over time (weather, news, events, styles, advertising, etc.).

This is not the place to discuss the method itself but an example will illustrate the kind of results that can be obtained. Mr. Lewis Shipper, of the Research Seminar in Quantitative Economics, has used a Survey Research Center three-year reinterview sample covering 400 spending units to explore consumer expenditure on durable goods. A regression fitted to the cross section is

$$\begin{array}{lllllll} (1) & E = -16 + .11Y & + .062\Delta Y & + .041L & + .61D & - .10S_{-1} \\ & \qquad\qquad\quad (.013) & (.035) & (.017) & (.10) & (.045) \end{array}$$

where E is expenditure for durables, Y is disposable income, L and D are liquid assets and consumer debt at the beginning of the year, and S_{-1} is discretionary saving the preceding year.

Bias in the measurement is clear in the coefficients of D and S which purport to show that expenditure for durables rises with indebtedness and declines with the accumulation of saving.

Using our method of analysis, the operating characteristic is first expressed as

$$\begin{array}{llllll} (2)\ E_{it} = 128 + .080Y_{it} & + .040\Delta Y_{it} & + .042L_{it} & - .66D_{it} & + .17S_{it-1} + c_i + d_t \\ \qquad\qquad\qquad\quad (.056) & (.045) & (.037) & (.09) & (.04) \end{array}$$

The values of c_i are then regressed on other variables:

$$\begin{array}{llll} (3) \quad c_i = -31 + .025\overline{Y}_{i.} & + .048\overline{\Delta Y}_{i.} & - .012\overline{L}_{i.} & \\ \qquad\qquad\qquad\quad (.014) & (.037) & (.019) & \\ \qquad\quad + 1.26\overline{D}_{i.} & - .24\overline{S}_{i.} & - 10.4C & + 7.8X \\ \qquad\qquad (.10) & (.05) & (18.7) & (25.0) \\ \qquad\quad - 85.R & - 238P_1 & - 115P_3 & - 284P_4 \\ \qquad\qquad (111.) & (99) & (93) & (83) \end{array}$$

The variables in (2) have the same meaning as in (1). (3) incorporates means (over time) of the same variables, and in addition: C = family size, X = age of head, R = race (white = 0; Negro = 1), while dummy variables represent the effect of size and class of city, measured as deviations from suburbs of metropolitan areas: P_1 = metropolitan area, P_3 = other cities over 50,000, P_4 = town under 50,000.

The coefficients in (1) are approximately the sums of those in (2) and (3). That is, the cross-section regression is a combination of (2), representing the short-run operating characteristic, and (3) representing a longer run personality syndrome. Thus the coefficient +.61 on consumer debt in (1) contains two components: for any given family at any given time, we see in (2) that the fact of being more in debt tends to discourage expenditure on durable goods. But among families, as we see in (3), expenditure for durables is associated with already being more in debt than average.

It should be noted that variables like C, X, R, and P could equally well have been incorporated in (1) and would have had the same meaning there as in (3); since they are perfect family correlates they could not, of course, have been used in (2).

The technique of the reinterview sample survey is now well developed, and while reinterview data are perhaps the most expensive of all to collect, the pay-off from their use in microanalytical models will be enormous. I hope we can look forward to their rapid extension and the incorporation of the results in analysis.

MONA E. DINGLE: There can be no question as to the importance of the current work in developing microanalytic models of the economy. On the surface, the proposed microanalytic framework would seem to have everything to recommend it and no disadvantages to detract from its value. As Professor Orcutt points out, the microdata he uses can be combined readily into the relevant macrodata, but at the same time they contain information permitting the study of relationships not possible through the use of aggregates alone. The only disadvantage to the use of this framework would appear to be the danger of making use of oversimplified operating characteristics in order to keep the task within the limits of available machine and human resources. This might consist either of limiting the number of relevant input and status variables or of assuming simpler functional relationships than are warranted.

I must confess that I do look upon this as a danger in the use of the model for short-term forecasting purposes. Year-to-year changes in consumer purchases of durable goods, for example, may not be great in relation to their level in conditions such as those prevailing in the postwar United States. These changes, however, may reflect the complex interaction of a number of influences that are quite different from those determining differential purchase probabilities and the general level of purchases. Those demographic and individual financial variables which explain a substantial amount of the level of durable goods purchases generally change very little over the short period. Moreover, observation suggests that major changes in expenditure rates are generally similar for major economic and financial groups.

Efforts to improve short-term forecasting of consumer expenditures must involve considerable work along the following lines. First, more experimentation is required in new types of buying plans and general attitudinal questions that will give a better measure of the strength of consumer demand than those currently in use. Second, considerably more work needs to be done on the relationship between consumer purchases and changes in general business conditions as well as specific developments in industries serving the consumer and the way in which these factors are related to the attitudes and intentions expressed by consumers. I am not sure that these variables need to be introduced on an individual household basis, but I am convinced that it would be a mistake to omit these variables completely or oversimplify the nature of the relationship because of limitations of machine or staff capacity.

I have plotted Professor Goldberger's estimates of regressand means based on pooled regressions against the observed values reported. On the basis of this comparison, I have concluded that as a policy-maker I should be most reluctant to rely on estimates based on household demographic and financial variables. In general, the movements of the estimates are less sharp than those of the observations from year to year and they tend to be too low in the early years and too high in the later years. It should be noted, however, that aggregate data from other sources show less sharp movements than the survey data used in the paper and give no basis for the 1955 decline in average durable expenditures. The introduction of the two variables measuring general economic conditions appears to improve the fit of the estimates with the survey data by removing the upward trend and increasing the sharpness of short-run downward movements. It is possible, however, that the apparent negative relation of the output variables to the consumer price index merely reflects the downward trend in the relation of durable expenditures to the individual household variables rather than a response to price movements as such.

I am in general agreement with the desirability of obtaining more data through reinterviews or panel studies with identical units. I believe, however, that considerable thought should be given to the purposes for which such data are wanted and the best means of satisfying those needs before embarking indiscriminately on reinterview studies of the types utilized in the past. In general, reinterview is a means of obtaining more information about a given unit than is feasible in the course of a single interview, whether because of respondent exhaustion or because of reporting problems. Attitudes represent an extreme case of data that must be collected currently. It is generally believed, however, that most financial data are also reported more accurately on a current basis and that change data for some items may be more accurately computed by comparing stock data at the beginning and end of the period.

Most large-scale surveys in the past have incorporated reinterviews only by including a subsample of reinterview households and asking questions identical with those asked the nonreinterview households. This procedure has advantages from the standpoint of obtaining comparable cross-section information for all families over a period of time. Recent investigation suggests, however, that the quality of the reinterview information may be prejudiced unless questions are adapted to take advantage of the reinterview situation.

Reporting and processing errors, always a problem in consumer surveys, assume an additional dimension in reinterview studies. Even when they cancel out in the aggregate, their effect may be to yield unrealistic relationships for individual decision-making units which may bias models incorporating them. These errors appear in connection with replies to even the simplest questions, but they are compounded in connection with certain complex financial information. Data collected in the Quarterly Survey of Consumer Buying Intentions show that about 15 per cent of those who reported buying a durable item in the quarter just ended had reported buying an identical item in the preceding quarterly survey. In a recent experimental reinterview survey of 300 middle- and high-income families, we attempted to obtain change in certain financial items, such as checking and saving accounts, by comparing data on holdings at the beginning and end of the period. Field experience showed that even the most co-operative respondents might report certain accounts in one interview and not the other, and the problems were increased when assets were held in trust or jointly with persons outside the family unit.

A second limitation of the use of reinterview for the purposes envisaged by Professor Goldberger is the long period of time over which data would have to be collected to meet some of his needs. For example, present size and composition of financial portfolio may reflect income, investment practices, and attitudes over several decades. Some experimentation has been carried out recently in collecting long-term financial history in consumer surveys, although it is recognized that reporting errors are substantial. In addition, it may be possible to take account of some of the factors by introducing time series variables at the aggregate level. In view of the many limitations of available household data and changes in relevant relationships over time, I personally am convinced that much of the usefulness of Professor Goldberger's model will necessarily depend on how well he is able to adjust for problems of response and nonresponse in household surveys and how well he is able to incorporate aggregate measures into the relationships.

REAPPRAISAL OF THE DOCTRINE OF CONSUMER SOVEREIGNTY

THE COSTS OF AUTOMOBILE MODEL CHANGES SINCE 1949

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*Abstract**

This paper reports estimates of the costs to the economy of the changes in private automobile specifications that took place during the fifties. In such costs are included not only the costs to the automobile manufacturers themselves of special retooling for new models but also the direct costs of producing larger, heavier, and more powerful cars, as well as the costs of automatic transmissions, power brakes, and the like. Finally, we include the secondary costs not paid out by the automobile companies but paid nevertheless by the consuming public in the form of increased expenditures for gasoline necessitated by the "horsepower race."

Throughout, we concentrate on the cost of the resources that would have been saved had cars with the 1949 model lengths, weights, horsepowers, transmissions, etc., been produced in every year. As there was technological change in the industry, we are thus assessing not the resource expenditure that would have been saved had the 1949 models themselves been continued but rather the resource expenditure that would have been saved had cars with 1949 specifications been continued but been built with the developing technology as estimated from actual car construction cost and performance data.[1]

In thus assessing the costs of automobile model change, we do not mean to deny that such changes also brought benefits. Indeed, it is quite clear that most or all of the changes involved were in fact desired by the consuming public (perhaps after advertising) and that the automobile companies were satisfying such desires. Nevertheless, the costs estimated seem so staggeringly high that it seems worth while presenting the bill and asking whether it was "worth" it, in retrospect.

The largest component of the cost of model changes since 1949 turns

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* The full paper which is too long to be published here will be published in the *J.P.E.*

[1] The year 1949 was used as the earliest year for which all necessary data were available. The results would not be substantially altered if 1950 or 1951 were used.

out to be the higher costs of automobile construction (as measured by automobile prices) attendant on higher horsepowers, greater lengths, greater weights, and so forth. As the cost of a given specification varies with technological change (in particular, that of horsepower clearly declines over time), such costs were estimated by a series of cross-section regressions of the list prices of a given year's models on the specifications thereof.[2] From these regressions, estimates of the cost of construction of the average 1949 car in each successive year (given the retooling expenditures which actually took place) were constructed and compared with the average list price of actual models. Optional equipment was separately costed, as were advertising expenditures. The results showed an average cost per car (in current prices) over 1956-60 of $454 for size and horsepower plus about $116 for optional equipment and $14 for advertising. The total estimated costs of such items thus averaged about 3.3 billion dollars per year for the same period.

These estimates, however, make no allowance for the retooling expenditures which would have been saved had 1949 specifications actually been continued; they merely estimate the saving from producing cars with such specifications given the actual retooling expenditures. Accordingly, we next estimated the saving in retooling expenditure that would have occurred in the absence of model change, basing our estimates on the expenditures for special tools reported by the automobile companies to the Securities and Exchange Commission and charged by them to profit and loss. We concluded that, again in current prices, such savings would have averaged about $99 per car over the 1956-60 period, total savings coming to about 560 million dollars per year.

The total costs of model change as estimated so far came to about $700 per car (more than 25 per cent of purchase price) or about 3.9 billion dollars per year over the 1956-60 period. However, unlike the costs so far considered, there are other costs of model changes which are not exhausted with the construction of the car but are expended over its life. Chief among these (and the only one estimated by us) is the additional gasoline consumption due to changes in transmissions and especially to increases in horsepower.

This part of the study was broken into halves. First, we estimated the relation between over-all gasoline mileage as reported by *Consumer Reports* and the "fuel economy factor" reported by the same source.[3]

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[2] An extended discussion of these regressions (and some of the regressions themselves) may be found in Z. Griliches, "Hedonic Price Indexes for Automobiles: An Econometric Analysis of Quality Change," Bureau of the Budget—NBER Price Statistics Review Committee Staff Report, No. 3, printed in U. S. Congress, Joint Economic Committee, *Government Price Statistics,* Hearings. . . . Jan. 24, 1961, pp. 173-96.

[3] This is essentially a measure of displacement times engine revolutions per mile.

This analysis was divided by type of transmission and number of forward speeds. We then proceeded (much as in our analysis of direct costs) to analyze the technologically changing relationship between advertised horsepower and displacement (the principal component of the fuel economy factor) by means of a series of cross-section regressions using the engines produced in successive model years. We interpreted the results in terms of engine redesign to secure higher horsepower at given displacement and used them to compute the displacement that could have been secured for the 1949 model horsepowers. We then used the relation between displacement and gasoline consumption via the fuel economy factor to estimate the gasoline consumption that would have been obtained with 1949 horsepowers. The result showed that whereas actual gasoline mileage fell from 16.4 miles per gallon in 1949 to 14.3 miles per gallon ten years later, then rising to about 15.3 in 1960 and 1961, the gasoline mileage of the average 1949 car would have *risen* to 18.0 miles per gallon in 1959 and 18.5 in 1961. This meant that the owner of the average 1956-60 car was paying about $40 more per 10,000 miles of driving (about 20 per cent of his total gasoline costs) than would have been the case had 1949 models been continued.

We then utilized these results to compute the cost of such additional gasoline consumption by the car stock, estimating this to average about 968 million dollars per year over the 1956-60 period in current prices. Moreover, since such additional expenditure continues over the life of the car, we estimated that even if 1962 and all later model years were to see a return to 1949 specifications, the 1961 present value (in 1960 prices) of additional gasoline consumption by cars already built through 1961 discounted at 10 per cent would be about 7.1 billion dollars.

We thus estimated costs of model changes since 1949 to run about 5 billion dollars per year over the 1956-60 period with a present value of future gasoline costs of 7.1 billion.[4] If anything, these figures are underestimates because of items not included. As stated at the outset, most of these costs were stated in the price of the car and it is difficult not to conclude that car owners thought the costs worth incurring at the time of purchase. Whether, in retrospect, this means that they were in fact worth incurring is a question we do not attempt to answer.

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[4] We do not present complete figures for 1961 due to lack of data at time of writing. Preliminary estimates indicate that costs in that year (including gasoline consumption) continue well above 5 billion dollars.

ON THE PRINCIPLE OF CONSUMERS' SOVEREIGNTY

By Tibor Scitovsky
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Many attacks from many quarters have been launched in recent years on the principle of consumers' sovereignty. They have questioned the economist's wisdom in putting too great and exclusive a trust in the consumer's wisdom; and it is regrettable that these attacks have shaken the public's faith in the economist but have not shaken the economist out of his established modes of thought. Indeed, American economists have largely ignored these attacks, following an old American tradition of keeping hands off welfare economics—applying its results but refusing to cast a critical look at the derivation of these results. I have been fighting this tradition for some time, because I believe that much of the criticism is valid and economists should take it to heart. I have much more to say on the subject than time to say it in, and have said much of it already, so I shall confine myself here to two issues: the choice between market and collective goods, and the problem of whether the market can cater to consumers' tastes truly and well.

The first issue stems from the realization that the sovereignty of the consumer is not at all the same thing as the sovereignty of the individual or citizen. The consumer is just one facet of the individual—the one that has to do with the consumption of goods sold through the market. The consumer's welfare therefore is only a part of man's welfare and only a part even of his economic welfare. Choosing between market and collective goods, deciding whether a given service is better provided through the market or by public spending, determining the best allocation of public funds among their various uses—all these are economic choices no different and no less important than the consumer's choice between two market goods; and yet, our society has failed to develop adequate machinery through which the public could express its preferences on these issues. For, as Galbraith pointed out, advertising, the American tradition of self-reliance, belief in the advantages of private enterprise, and the economist's excessive preoccupation with consumer's choice in the market, not only have biased the American public against collective goods but even prevent its forming and expressing rational preferences on the economic aspects of any choice involving them, so much are these issues befogged by ideological considerations. The more's the pity, because a variety of recent changes and developments are rendering these choices ever more important.

Historically, there is plenty of excuse for such bias. For many centuries, food, clothing and shelter symbolized market goods, while cathedrals, palaces, and armies were the symbols of collective spending; and most of us would favor absolute priority of the first over the second group. The tendency to think in these terms persists today, although in most developed countries the choice has long ceased to be so simple. On the margin, which is where choices are made, most expenditures in a developed economy have to do with leisure; and today, society's marginal choice between market and collective expenditures is no longer a choice between more bread and more palaces but more nearly that between TV sets and other gadgets and appliances on the market side and public services and recreational and educational facilities on the collective side. This is the kind of choice that the Planning Commission of France must have had in mind when they recommended a faster expansion of collective services than of the consumption sector and warned against the social malaise that might result from catering to the consumer's every whim.[1]

Another explanation of our undue emphasis on the consumption of market goods may be the fact that our economic thinking was formulated at a time when many collective goods were free but which today are no longer free. The increase in population density and man's tendency to fill the countryside with factories, automobiles, and empty beer cans have created a world in which fresh air, clean water, and the enjoyment of nature are no longer free goods. Smog control and the decontamination of polluted rivers are expensive operations, and so is the creation and maintenance of "nature areas" in a world whose wide open spaces are rapidly being subdivided into quarter-acre lots. The external diseconomies of the production and consumption of market goods render such collective goods increasingly scarce and expensive; but economic theory, social accounting, and most public policy still proceed on the fiction that external diseconomies are small enough to be neglected.

Besides the rise in living standards and the crowding of space, increased life expectancy, secular inflation, and uneven progress and the resulting change in relative prices are all among the factors that call either for more provision of collective goods and services or at least for a reconsideration of the question which goods and services should be provided collectively and which through the market. Increased life expectancy demands of the individual more and more careful long-run budgeting at the very time when secular inflation and the uncertainty it creates are diminishing the market's ability to handle long-run budgeting. This, together with the changing nature of the family, which no longer provides a place for the aged, explains the rising demand and rising recognition of demand for the collective provision of social security. Increased life expectancy is also bringing about a situation in which the leisure classes are no longer the rich but the aged, who however are at the same time also the poor of modern society. This too is causing many people to wish to do some reallocating of spending from market goods to collective services.[8]

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[1] Cf. *Le Monde*, Oct. 17, 1961.

Changing relative prices are another factor relevant here, because they can change people's ideas on which services should be distributed free and paid out of public funds, which should be subsidized, and which sold at full cost through the market. This is so, because given the distribution of income and wealth, the inequality with which a particular good is distributed depends on its price in relation to other prices. The higher its relative price, the more unequally the market distributes it. It can happen, therefore, that the rise in the price of a good should increase the inequality of its distribution beyond the point tolerated by public opinion, which will then demand either its subsidization and sale below cost or its free provision out of public funds. In this age of fast and uneven technical progress there are many instances of this happening. An illustration is the increasing public demand in developed countries for national health insurance or free medical care.

In discussing some of the factors that in today's more complex world call for greater reliance on collective goods and services, I am not forgetting the arguments against the element of compulsion and the lesser safeguards against inefficiency and waste in the public sector. In the past, we have fought these troubles the easy way by trying to minimize the public sector itself. Its growth and the increasing need for it may compel us to fight the hard way for its more satisfactory performance.

We can now proceed to our other subject: the criticism of consumers' sovereignty in the narrow sense. The two main objections here are, first, that in this age, when man's control over his fellowmen's beliefs is almost as great as his control over nature, the economist should still continue to regard consumers' preferences as a datum and the standard by which to judge the performance of the economy; and, second, that even by the questionable standard of consumers' preferences, the market economy performs badly, and for reasons not even considered in traditional economic analysis.

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[8] Cf. Bertrand de Jouvenel, "Efficiency and Amenity, 40th Earl Grey Memorial Lecture," King's College, Newcastle upon Tyne; and his "The Political Economy of Gratuity," *Virginia Quar. Rev.*, Autumn, 1959.

In the days of the handicraft economy, every piece of clothing, every piece of furniture was made to the specifications of the person who bought it; but from this position of 100 per cent consumer sovereignty we have retreated long ago. Consumers yielded their dominance first to merchants, who had the initiative in placing orders and specifying the nature and design of products for a long period, and later to manufacturers, who now decide themselves what to produce. The consumer's loss of initiative involves no great loss of sovereignty as long as he is given an adequate range of alternatives to choose from and is able to distinguish the good from the bad and to recognize solid construction, good design, and practical and imaginative ideas. These conditions, however, are the less fulfilled, the more the economy and technology progress.

Economies of scale not only cheapen large-scale production but by raising wages they also raise the cost and diminish the profitability of small-scale production. This in turn raises the minimum volume of sales necessary to render production profitable and thus leads to an ever increasing narrowing of the range of variants of products offered and neglect of minority needs and tastes in the nature and design of goods produced and marketed.

The increasing neglect of minority preferences is a bad thing, because it is illiberal, makes for uniformity, and destroys to some degree the principal merit of the market economy: its ability to cater separately and simultaneously to different people's differing needs and tastes. Also, the more the market loses this ability, the greater the extent to which majority preferences are imposed upon minorities and the more do the nature and formation of these majority preferences become matters of public concern.

Now the very failure of the market to cater to minority preferences may have undesirable effects upon the development of majority preferences as well. Even the most ardent believers in consumer sovereignty must realize that most tastes are acquired, that bad tastes are as easy to acquire as good ones, and that the best one can hope for is that by example and imitation the good will prevail over the bad if given an even chance. An additional advantage, therefore, of a market that caters to different people's differing tastes is that it gives those with informed tastes a chance to set an example to the rest of the community. Informed people, however, are always a minority; and when they are too small a minority—or economies of scale are too great—for producers to cater to their demand, then they are unable to set an example and fulfill their educative function.

Informed people are partly the experts who either as professionals or as amateurs have an intimate knowledge of a particular type of consumers' good—and it goes without saying that the expert public for music is generally a different group of people from the expert buyers of automobiles. A second part of the informed public is composed of generally educated people, who either are informed or if not know how to inform themselves.

I should like to see the tastes of experts catered to, because they know something about technical excellence. I should like to have the preferences of the generally educated public respected, because they have a wider perspective, apply a variety of criteria, and pay attention to the relation and connection between different criteria.

I admit, of course, that the preference for an educated taste is simply the subjective preference of educated people; but they, or most of them, have the tremendous advantage of having, at an earlier stage, been uneducated and uninformed themselves. In the early work on the theory of consumer satisfaction, the Greeks could never resolve the problem whether men or women enjoyed more the pleasures of love, because they could not draw on the experience of people who had tasted these pleasures in both capacities. In approaching our problem we have no such handicap. I cannot claim that an informed person's tastes are better by any test than an uninformed person's, or that they are more conducive to happiness or more appropriate to the atomic age; but I can claim that they are based on knowledge of a wider range of alternatives, which includes the alternatives available to the uninformed person.

Let me also recall that the issue is not whether uninformed tastes should or should not be suppressed and displaced by informed ones. I am merely deploring and criticizing the tendency of scale economies to keep the market more and more from catering to informed, or, if you wish, highbrow, tastes and thus to keep these tastes from competing on an equal basis with uninformed and lowbrow tastes in molding the preferences of the public at large.

Who then influences the majority's preferences and how? I can think of several channels through which is imposed what David Riesman called "other directedness," not so much the taste of the representative consumer as what public-opinion experts believe to be his taste. As already mentioned, the increasing importance of scale economies has greatly raised the penalty producers have to pay for making the wrong guesses about consumers' tastes and putting unpopular products on the market. Hence the tendency of producers in an increasing number of fields to play safe and not to risk imaginative innovations in the new products, services, and publications they put on the market but to rely instead on market research into the consumer's unfulfilled desires. At its best, this can slow down genuine progress and innovation in the design of products; at its worst, it can lead to a serious misreading of the public taste and the imposition of a mythical majority taste that in fact few people share. The automobile industry, with its hand on the consumer's pulse, has for many years diagnosed a chronic yearning for longer and wider and more powerful cars; and had it not been for foreign competition, we—and they—might never have found out how wrong they were. Similarly, Hollywood used to proclaim twelve as the median age of the American movie audiences; and if it had not been for the success of foreign films, we would still live under the shadow of this depressing thought.

One trouble with such misreadings of the majority's mind is the difficulty of finding out how wrong they are. Competition seems no adequate safeguard. The consumer is all too often in the position of the voter who has but one candidate to vote for or several candidates who all stand for the same thing. And to complete the simile, the consumer too is subjected to a barrage of advertising to persuade him that he really wants the product which is the designer's realization of what the market researcher believes to be the average consumer's wishdream.

Another factor responsible for the other-directedness of the consumer's taste has to do with the increasing importance of durable goods in the consumer's budget. The most important of these, cars and houses, are bought not only for consumption but also as an investment for their resale value; and buying for high resale value means buying not what one wants but what one believes other people want. The consumer buys extra trim on his car, not necessarily because he wants it, but because the salesman assures him that it will raise the blue-book value of his car in the secondhand market. He is forced to avoid all but the most conventional design and construction in his house, because to get a good mortgage, the house must conform to what the appraiser believes, perhaps wrongly, the majority taste to be. Accordingly, house construction is governed to quite an extent not by what the consumer wants but what an unimaginative and not very expert middleman expects other consumers to want.

Luckily for the consumer, his writ still runs in many areas; but it is none too soon to start thinking about how to remedy the situation. Also, the above points were merely a sample of the things that are wrong with consumer's sovereignty but a sufficiently representative sample to raise the question of remedies and policies. Most economists seem reluctant to face up to these questions, presumably because they visualize the dictatorship of an economic planner as the only alternative to the present situation. Such an attitude, however, shows a misunderstanding of the issues involved. Most critics object not to the consumer's sovereignty but to the ignorance and restrictions to which his reign is subject and to the influence businessmen have over it. We cannot and do not want to turn the clock back and return to a handicraft economy; and some shortcomings we may choose to put up with. However, some of those discussed in this paper can be remedied; and we may be able to establish safeguards to assure the satisfaction of a wider range of consumers and to guard against the undue and undesirable influencing of consumer's tastes. The choice is not whether consumers or a central planner should exercise sovereignty but whether and how the producer's power to ignore some consumers and influence the preferences of others should be curbed and modified.

This is not the place to discuss in detail the nature of a constructive answer to any of these questions; but a few precedents may be mentioned. Public carriers are required to offer service in off-peak hours and on little-traveled routes; the Pure Food and Drug Administration does impose curbs on a highly competitive industry; and Britain's Independent Television Authority is an excellent and successful example of how the influencing of consumers' tastes by market-research and public-opinion experts can be curbed, modified and supplemented by the influence of Distinguished Citizens. In a slightly different area, the survival of opera and serious drama and the publication of scholarly books are assured by subsidies—from the state in Western Europe, from other sources here.

All these, of course, are examples of exceptional cases justified by special circumstances. To extend them into a general rule would be much harder and more momentous than their admission as exceptions. Also, the further such policies are extended and the more the unfettered operation of the market is encroached upon, the more value judgments are involved. And here I should like to end on a note I started out with: the economist could wash his hands of value judgments only if the public's preferences were really given and he could accept them as such. As soon as this ceases to be true and the public's preferences are influenced by economic agents and the economic environment, value judgments on whether this influence is good or bad, in need of restraint or reform, cannot be avoided. If the economist feels incompetent to make such judgments himself, he should at least admit their legitimacy and provide the analytical framework to help others to make these judgments.

CONSUMERS' SOVEREIGNTY REVISITED AND THE HOSPITABILITY OF FREEDOM OF CHOICE

By Jerome Rothenberg
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It is now twenty-five years since W. H. Hutt, in his book, *Economists and the Public,* coined the title, if not the substance, of the concept of "consumers' sovereignty." In the intervening period, developments have occurred which affect both the interpretation and the ethical persuasiveness of the concept. In this paper I shall first raise some issues connected with the scope of the concept; following this I shall consider how changes in products and tastes affect the ethical status of the concept. My conclusion is that consumers' sovereignty is incomplete and ambiguous. In order to make it operational, a series of highly controversial, partly normative decisions have to be made. Further, the extent to which consumers *can* be truly sovereign is questionable. In view of this, the concept loses attractiveness. By contrast, a principle which is distinguished from consumers' sovereignty but which has often been treated indistinguishably—freedom of choice—gains attractiveness. The analysis indicates that the two are likely to be competitive to some extent; so we must examine our preferences between them more closely than we have done.

Consumers' sovereignty was early used in two senses: one descriptive, the other normative. In its descriptive sense it simply signified that the consumer was in fact the ultimate king: production in a market economy is ultimately oriented toward meeting the wants of consumers. Production is the means, consumption the end. More particularly, market performance is responsive to consumer demands. If we should ask the more interesting question of how responsive this performance is, we move over to the normative sense. In its normative sense consumers' sovereignty asserted that the performance of an economy should be evaluated in terms of the degree to which it fulfills the wants of consumers. Different institutional systems, and even different market structures under a market system, fulfill these wants in different degree. Thus, despite the fact that consumers' sovereignty in this normative sense has from the beginning been intimately associated with a belief in the optimality of the free market, even Hutt finds the responsiveness of the market to consumer demands to be less than ideal where monopolistic elements are present. It is on the normative usage, as a keystone of welfare economics, that we shall focus in this paper.

I. *The Scope of Consumers' Sovereignty*

The principle of consumers' sovereignty as presently employed is a value judgment which stipulates that we should take the degree of fulfillment of consumers' wants—or the degree to which performance accords with consumers' tastes—as a criterion for evaluating the social desirability of different social situations and, through these, the desirability of the various public policies or institutional structures which give rise to them. The form such a criterion should take is not obvious. For one thing, the central fact of scarcity means that no combination of social structure and public policy can lead to a satiation of all wants. The possible is limited by available resources and state of technological knowledge. Our criterion therefore becomes: how good is performance relative to the best it might conceivably be? Optimality consists in maximizing consumers' utilities subject to the constraints of available resources and techniques.

The first problem which must be faced in interpreting consumers' sovereignty has been recognized for some time. The criterion must be able to compare situations in which the well-being of a large number of individuals is involved. What does it mean to satisfy the potentially differing tastes of a numerous group? Does the principle itself determine a unique function of these tastes which is to be maximized? The answer is not clear. Indeed, even its epistemological status is not clear.

The principle surely requires at least that the first partial derivative of social welfare with respect to the welfare of any one individual be positive; that is, that any one person's improvement, everyone else's well-being being unchanged, is a sufficient condition for a social welfare improvement. Does it unambiguously imply any further restriction? In particular, does it require that the absence of opposite movements in the well-being of every pair of individuals be a necessary condition for such an improvement (so that in conjunction with the first requirement vector dominance in terms of the set of individual preference orders becomes the necessary and sufficient condition for improvement—the criterion of Pareto optimality)? This second requirement defines the aggregate of tastes in a particular way—as a vector—and aggregate taste comparisons in a correspondingly particular way—as vector comparisons. But other definitions are possible: any one of the large family of functions of individual orderings restricted only in that the first partial derivative of social welfare with respect to every individual welfare argument is positive. The normative content of consumers' sovereignty does not seem to me to imply or even to point decisively to any one of these. Is it, for example, really in the spirit of consumers' sovereignty to assert that no amount of improvement to 99 per cent of the population can more than offset a slight deterioration of well-being to the remaining 1 per cent in evaluating social welfare?

Consumers' sovereignty has been thought to imply the Pareto optimality criterion. I believe this to be largely because in its early treatments it was deemed equivalent to allowing consumers to trade freely on purely competitive markets, pure competition being taken as the institutional structure which permits the freest expression of tastes. The set of outcomes of such trade, starting from each of the different logically possible initial distributions of purchasing power, has been proved to be the Pareto optimal set, given some qualifications originally thought to be minor. Two recent emphases have diminished the association. One is the distinction stressed by Oskar Lange and Abram Bergson between consumers' sovereignty and freedom of choice. The first refers to consumer tastes as the goal (or end) of production and distribution. The second refers to the administrative procedure of allowing consumers to use purchasing power belonging to them to make whatever voluntary trades they wish on a market. While the administrative procedure—or means—can be an end in itself, it is not the same end as consumers' sovereignty. Consumers' sovereignty can exist without freedom of choice, as where a central authority produces and distributes commodities to the population on the basis of what he has discovered their tastes to be (by questionnaires, etc.). Also, freedom of choice can exist without consumers' sovereignty, as where the central authority decides on the basis of arbitrary reasons not related to what it thinks consumers want what should be produced and then allows this to be distributed by means of the market choice of the population, setting relative prices so as to make all consumer markets clear. Thus, the Pareto optimality of pure competition is a reflection not of consumers' sovereignty alone but of its conjunction with freedom of choice. Consumers' sovereignty has an intimate link with the Pareto criterion only by supplementing it with the value judgment that it be realized through freedom of choice.

The second recent emphasis which weakens the association with the Pareto criterion is that pure competition is Pareto optimal only if there are no external effects. If external effects are present, pure competition is suboptimal (except through "errors" being canceled out by extreme coincidence). Many economists, including myself, believe external effects to be in fact widespread and important. If we are correct, then to treat free competitive trade as most fully realizing consumers' sovereignty is tantamount to employing a criterion which is inconsistent with Pareto optimality. Thus, the Pareto criterion has no natural appositeness to consumers' sovereignty either in terms of logical implication or of the historically broader connotations of the latter concept.

I conclude that consumers' sovereignty does not logically imply a criterion restricted adequately to be at all useful. It is incomplete. To make it more complete requires deciding on a more precise treatment for aggregating tastes, thereby adding restrictions which will narrow down the family of acceptable social welfare functions. Such assumptions specify the relative compensatory effects of different individuals' tastes in welfare: they are normative judgments about distribution. Pareto optimality is one such restriction.

It has been thought that Pareto optimality is the least controversial value judgment that need be added to make the criterion useful. We know, however, that, however unexceptionable, it does not produce a complete criterion. We cannot use it to choose from within any set of nondominated situations—for example, from the Pareto optimal boundary. This is a serious limitation of scope. It is doubtful, for example, whether as many as 1 per cent of all economic changes and political acts in modern history would be evaluable under the principle. Societies have certainly been willing in the past to make changes which were not vector-dominance improvements; they give no indication of being less willing to do so in the future. Thus, the Pareto-optimum criterion could not judge the welfare impact of most of modern history and is not likely to do better in the foreseeable future.

The attempts of the New Welfare Economics to extend the scope of the Paretian criterion by means of the compensation principle involve adding still further normative assumptions. The version of the principle by which welfare judgments cannot be made unless compensation is actually paid can be interpreted either as going no whit beyond the original criterion (since it asserts that, except for equivalence, unless one outcome actually dominates another the two cannot be compared), or as recommending that the polity undertake actual compensation whenever possible so as to make more historical choices comparable. But the latter interpretation makes advocacy of the compensation principle a value judgment: the *status quo* distribution of well-being is made the normative frame of reference for welfare comparisons (whether because of an ethical content to the *status quo* or for the sheer convenience of the welfare evaluator). The version of the compensation principle whereby judgments about potential welfare can be rendered in terms of vector dominance resulting from hypothetical compensations, without actual compensation being necessary, clearly involves a value judgment supplementing Pareto optimality. This last argument, by the way, means that normative assumptions must be added to consumers' sovereignty to obtain a complete criterion —one that renders judgment in every choice situation—even if one believes that the Pareto optimality criterion is actually implied by this concept. In sum, supplementing Pareto optimality with the compensation principle entails introducing additional value judgments considerably more controversial than Pareto optimality itself. If this is true of the Pareto optimality approach, the need to make controversial value judgments with other approaches can be *a fortiori* established.

The fact that consumers' sovereignty does not imply a unique complete criterion is serious. The family of functions possessing the property that the first partial derivative of social welfare with respect to every individual welfare argument is positive is very large. The leap from consumers' sovereignty to a complete criterion is accordingly substantial. The decision to use one particular function instead of another even only moderately different can make a bigger difference to social welfare evaluations than the most radical changes in the tastes of several individuals.

II. *Which Tastes Are Relevant?*

The second problem in defining consumers' sovereignty as a criterion is that it is not obvious which tastes are the relevant ones to consult. Three dimensions of the problem can be distinguished: which tastes, whose tastes, and tastes for what. First, if an individual is obviously uninformed about certain kinds of commodities, are his expressed preferences the right ones to consider? Since he himself would change his preferences if he were better informed, should not his present evaluations be considered the wrong tastes—not really his—and be substituted for in the light of his "true" tastes?

How much information and experience concerning commodities is necessary to make an individual "correctly" informed? A conceivable empirical test would be to expose an individual to more and more information (experience) about the relevant consumption area so long as he keeps changing his preferences. Well-informedness would be the state of preference stability. Such a process *might* lead to a limit set of tastes.[1] But this cannot generally be expected. Accumulating exposure over time changes the individual; his expressed preferences may continue to change because his "true" tastes are changing. In these cases it is impossible in principle to distinguish "correctional" changes from "real" changes. Any judgment about well-informedness here would be a value judgment.

The second dimension involves a deeper problem. Psychologists believe in the existence of "erroneous preferences" which cannot be "corrected" by simply providing information or experience. Feeblemindedness, psychosis, neurosis, dope addiction, immaturity, and perhaps criminality are such states where the individual wants what he does not "really" want. Does consumers' sovereignty require that individuals in these states be disenfranchised, or that an attempt be made to discover their "true preferences"? Psychiatrists claim to know what unconscious motives really impel some neurotics and psychotics; but these motives are often pathological and are unacceptable to the patients themselves. Also, the physician's concept of normality intervenes. It is felt that only when the patient is cured can his motives be said to be truly his. But while the practitioner can often understand existing unconscious complexes of motivation, he is likely to be far less capable of predicting what the person will—or would—be like when cured.

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[1] Indeed, I myself have argued that it sometimes would. "Welfare Comparisons and Changes in Tastes," *A.E.R.*, Dec., 1953, pp. 885-89.

Thus, "correction" of the preferences of sick people is neither objectively straightforward nor ridiculous. Its possibilities rather depend on opinion which, given the empirical uncertainties and the emotive implications, are likely to be value-saturated. This conclusion is even stronger for children and, possibly, criminals. But what about the claim of psychologists that even most normal law-abiding adults do things they do not really want to? To be serious about sovereignty requires evaluating this claim and substituting corrected preferences in the criterion wherever it can be substantiated. Perhaps the enormity of the task and the controversiality of the objective grounds for correctly performing it would lead one to wish to confine it only to those cases where the existing distortion of tastes is substantial. But application of such a principle is likely to be at least as much value-laden as the decisions about the immature, the sick, the outlaw—and much more controversial.

The third dimension of the problem of defining relevant tastes concerns not which are the true preferences but rather what are the alternatives to which the preferences refer. This is probably the area where recent speculation differs most from the context envisaged by those who first proposed consumers' sovereignty. Welfare analysis has usually assumed that each individual's well-being, therefore his preferences, depends only on the commodities which he himself consumes. In this formulation, tastes are completely distinct from the function which joins them into a welfare criterion. But a number of economists have recently emphasized that an individual's well-being depends importantly on consumption by others as well as himself. There are three types of dependency. First, specific acts of consumption by others directly affect the individual; for example, the growing of roses by the neighbor of a man with a severe allergy. Second, the standard of living of specific other persons either angers him because of envy or pleases him because of empathy. Third, he has strong opinions about what should be the general shape of the frequency distribution of income. I have argued in the *Measurement of Social Welfare*[2] that the welfare impact on the individual of these external relations is psychologically of the same type as that of most of his own consumption, being a matter of social interaction. Thus, it seems reasonable to include them in spelling out the alternatives of choice to which tastes refer. Consumer sovereignty should concern consumer "values" rather than tastes, in Friedman's and Arrow's terms.

These external effects deserve consideration because they affect the individual's utility. Does any variable, therefore, deserve consideration if it affects utility? Individuals often have strong feelings about the kind of institutions they want to make social decisions about economic matters. Since these institutions reflect social rules or criteria for adjudicating among the various claims of the population, a concern about them can be treated as a concern about social welfare criteria. This is an external effect intimately related to attitudes about income distribution: it represents a concern about the principles which ought to govern that distribution. The allegiance to "free markets" or to "planning" is often considerably stronger than preferences about the exact composition of one's own consumption. Should these effects be included?

There is a difficulty. Suppose consumers' sovereignty is to be supplemented to construct a particular positive function of individual utility functions. Then the last inclusion would mean that these utility functions will themselves contain as an argument the set of possible functions of individual utilities that might serve as social welfare criteria, since each individual ranks not only commodity distributions but also welfare criteria. If our welfare criterion is designed to reflect tastes that include preferences about welfare criteria, our criterion should be in some sense "consistent" with these preferences. Other than unanimity, however, of what would such "consistency" consist? How could such a criterion be selected? Clearly, it would have to be selected by a "meta-decision," made outside the decision system which the criterion is to adjudicate. Consumer sovereignty should be defined on that level, too, but its definition will be subject to many of the same complexities we have met on the lower decision level. The criterion chosen to adjudicate on the two levels need not have the same structure. Indeed, it is not obvious how such a higher choice of criteria is to be made at all unless, by successive regression to higher and higher levels, unanimity is finally reached.

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[2] Prentice-Hall, 1961, Chap. 2.

The analysis suggests that preferences about welfare criteria be excluded after all as arguments of the individual utility functions on our original decision level. But then perhaps general attitudes toward income distribution should also be excluded, since they are so intimately related to preferences about welfare criteria. Do such attitudes have relevance for resource allocation independently of their relevance for the choice of welfare criteria? If so, how could such independent influence be partitioned to the appropriate decision levels? I cannot answer these questions. Indeed, here too I am not even sure of the epistemological status of the answer. My conclusion is tentatively to suggest, as before, that controversial value judgments are probably involved. Consumers' sovereignty here too can only be defined by recourse to complex and controversial normative assumptions.

A final complication on this dimension. We have just questioned the inclusion of "impartial" judgments about the consumption of others on methodological grounds. What about "partial" judgments? If individual A begrudges high income to individual B because he dislikes B or is simply envious, does this have the same ethical status as his allergic complaint over B's roses? Personal experience suggests that many persons would wish to separate the two ethically. Some complaints about others' behavior seem justifiable, others do not. On what criterion should such a distinction rest: real versus unreal injury (or benefit)? The person feels just as "really" injured through envy as through asthma. Yet an outsider would often want to say that the first type of complaint, but not the second, is unjustified because it is just none of his business. Perhaps the implied desideratum is that individual A cannot help himself in regard to his asthma but can in regard to his envy. This too is a slender reed. Can an individual really help himself for his tastes—for his personality? The typical link in all these external effects is psychological, not physical. Again, any criterion in this area will be largely a normative one.

To summarize this section, we have indicated that consumers' sovereignty does not make clear exactly which structures of individual tastes are to be consulted, or which individuals, or even what are the appropriate types of alternatives to which these tastes are to refer. Each area involves thorny problems whose resolution requires making controversial normative assumptions. Consumers' sovereignty, even if unqualifiedly accepted, must be a variable patchwork of value judgments; it will therefore mean different things to different people.

III. *Endogenous Changes in Commodities*

The above complexities affect the ethical persuasiveness of consumers' sovereignty as we shall see, but indirectly. Now we shall consider problems which have a more direct effect. Up to now, tastes—however finally specified—have been implicitly held to furnish a criterion external to and autonomous of the situations being evaluated. Moreover, the conceivable alternatives of choice have been assumed to be clearly delineated. The resulting evaluational process has an "integrity" which is important to its attractiveness. I suggest that in fact both of these assumptions are at variance with the real world.

The problems stem from the economy's use of substantial resources deliberately to change products and consumer tastes. Product development and advertising, as representative of these uses, employ considerable resources which have been increasing both absolutely and as a percentage of total output in the postwar period.

Product development affects our criterion in two ways: first, through an impact on the set of feasible output alternatives; second, through an effect on tastes. We postpone consideration of the latter to the next section. The first has the effect of making less clear how the criterion can be used to evaluate the efficiency of resource allocation. If all commodities remain unchanged over time, the alternatives of choice are simply different output combinations of the given commodities. Efficiency can be evaluated by the criterion through traditional welfare analysis. Suppose, now, given known modifications can be produced in these commodities by specified known modifications of resource use. Call this the modification model. It is not now enough to compare all the different possible output combinations of the single pattern of product modifications chosen at a given time. One must be able to compare the whole set of different feasible product modifications. This still can be done in principle—by applying our criterion to traditional analysis—since each investment for modification is specific and its outcome is specific in terms of the modification achieved and its estimated effect on demand. Besides, external effects will be minimal since we have assumed that all modifications depend on known processes and not on the results of possible unforeseen developments elsewhere.

Let us now, however, admit true innovations. Call this the innovation model. Unlike predictable modifications, innovations typically result from unpredictable outcomes of investment policies. One commits resources to try to bring about a particular product change or develop new products without knowing beforehand what will occur. The cost and benefit categories of traditional analysis apply here, but with an important distinction: costs are for the project as a whole (justified by its expected returns) while the benefits are for the unpredictable successful outcomes only. In addition, innovations typically carry substantial external effects in production and consumption—also largely unpredictable. These properties substantially complicate the problem of comparing the desirability of all possible ways of using resources, both for producing commodities under existing technology and for changing that technology in various ways. To appeal to "expected values" for comparability of different projects is hampered by the lack of grounds for ascribing probabilities and pay-offs except in a small minority of possible investment directions, since most possible innovating directions have probably never been tried. The attempt to bypass this by confining comparisons to the actual outcome of a particular pattern of innovating investment on one hand and either a no-innovation situation or one with some alternative investment pattern calculated in terms of expected outcome on the other, would be extremely misleading.

The trouble is that the existence of investments for innovation makes unclear just what is the set of alternative feasible outcomes. This trouble affects the integrity of many welfare criteria. But it especially affects consumers' sovereignty because, when applied to a free market system, performance is typically evaluated not directly by examining individual utilities but indirectly by looking at the degree of competitiveness of the system and the special provisions introduced in areas where external effects are significant. It is assumed that the market makes all feasible outcomes implicitly open to consumer choice and the degree of competitiveness determines the responsiveness of the market to these choices. The argument of this section is that the link between the resource implications of what the consumers think the alternatives are and those of what the producers think the alternatives are, becomes very loose. It becomes more hazardous to assume that actual market choices strictly "reveal" relevant preferences.

IV. *Endogenous Changes in Tastes*

What causes most trouble is endogenous changes in tastes. Consider the most extreme case first. There is only one firm. It uses part of its resources to produce some output without considering consumers' tastes. Then it uses the remaining part successfully to persuade the consumers that this output is exactly what they want. Are consumers sovereign here when their tastes change accommodatingly to output, not because of some inner dynamic of personality, but at the influence of resources deliberately used by the producer to gain acceptance of his output? It is not taste changes per se, accommodating or otherwise, that damage the normative integrity of consumers' sovereignty. It is endogenous taste changes—changes induced by producer investments designed to effect just such changes.

Few would insist that the consumer in this case is sovereign in any useful sense. The real world diverges from this, however, in a variety of pertinent ways. First, persuasiveness is not invariably effective. While consumers can be easily persuaded to some things, it is much more difficult or impossible (within the relevant range of persuasive techniques) to persuade them to others. Second, the degree of persuasiveness is a function of the resources used for persuasion. Greater persuasiveness requires using more resources. Third, there exist many producers, whose combined persuasive efforts to some extent cancel, or to some extent complement, one another. Fourth, some portion of these efforts consists largely in giving information or making available a new product. In the former, their effect is to "correct" tastes. In the latter, they induce tastes to be realigned with a new set of consumption opportunities.

Given the incidence of attempted persuasion in the real world, how much damage is done to our criterion? The answer depends partly on how strongly tastes are actually influenced by producers' persuasive efforts. That we should expect to find some such influence is indicated by the large and increasing expenditures on product development and advertising. Most economists agree that advertising can shift market shares for different brands within a given commodity class. But this may not seriously damage consumers' sovereignty. In an opulent society with thousands of types of commodities available, preference changes among brands of a single type of commodity may have only trivial effects on individual welfare. The billions of dollars of annual resources spent to accomplish such changes may not so much discredit the welfare criterion as suggest considerable waste in terms of that criterion.

Are important taste changes brought about by producer persuasion? Product development *in toto* has radically changed some patterns of consumption. But much of this stems from the information content of substantial changes in consumption possibilities brought about by innovation. A large part of "informational" advertising is linked to such major product advances. For these the dominant effect on tastes is "correction," not change. Other product development, however, represents only slight modification and is amenable to linkage with the kind of persuasive differentiation which is believed to be the mainstream of modern advertising. For this highly persuasive area of development and advertising taste change is the battlefield—whether a firm's aim is to prevent already-attached customers from detaching or induce otherwise attached customers to become attached. There is no definitive evidence available as to the importance of changes here.[3] One may speculate; but it is easy to exaggerate in this area. Advertising is not the only, nor even the strongest, influence on tastes. Personality core, social role identifications, social mobility, and informal interpersonal relationships are important determinants. One should not expect advertising to do very radical things. Of course, some of the indirect effects of advertising—on market structure, technological changes—may have stronger influence on over-all consumption patterns.

While advertising is probably not accountable for drastic changes, it is reckless to assume only trivial impact. The complex of product development and advertising has produced most of the economy's atomistic product differentiation as well as the larger configurational swings known as fashion. Consumption has changed variously and frequently under their flailing. Critics and advocates of advertising alike claim that advertising changes tastes. To the extent that they are true, these claims damage the acceptability of consumers' sovereignty.

One attempt to salvage consumers' sovereignty, despite the presence of endogenous persuasion, emphasizes that the consumer is not passive but selective under the buffetings of the persuasive assaults aimed at him. Advertisers propose—and often in contradictory fashion—but the consumer disposes. Besides, when he allows himself to be persuaded it is because he is improving his tastes, not simply changing them.[4] Thus advertising is not at all destructive of consumers' sovereignty. Instead of making consumers less discriminating it makes them more so.

In evaluating this it is helpful to link some types of product development with advertising. Atomistic product differentiation probably does show instances of improved consumer discrimination, largely in areas where the desire for variety is important. In many other instances even in these areas, though, the differentiation is illusory, adding nothing to the consumers' sensorium. The fact that a consumer is pleased when he consumes a persuasively advertised brand does not imply that he would not be just as pleased if he were to consume other brands. Differentiation associated with fashion, on the other hand, is likely to boast far less development of tastes. Individuals here are not chiefly interested in variety but in social distinction.[5] Fashion leaders cast off the old and set the new fashions chiefly as a competitive search for prestige and status by appearing distinctive rather than because of taste elevation or need for variety. The content of new fashions is chosen to prevent easy emulation, not to display improvement of wants. This is especially clear where fashion content changes cyclically, the styles of, say, ten years ago reappearing as the latest. Fashion behavior of style followers has much the same competitive motivation. Prestige here is obtained by emulating the leaders, conforming rather than seeking variety.

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[3] My own attempt to rectify this lack led to a highly inconclusive empirical study.

[4] Harry G. Johnson, "The Political Economy of Opulence" (unpublished paper).

[5] This analysis owes much to Dwight E. Robinson, "The Economics of Fashion Demand," *Q.J.E.*, Aug., 1961, pp. 376-98.

Thus, correctional effects do not seem to bulk large enough to mitigate much of the damage to consumers' sovereignty. Ironically, in fact, the occurrence of any such effects raises a new question which may weaken the criterion from a different direction.

To say that tastes are "improved" implies there exists a criterion which can judge between better and worse tastes. To be consistent with consumers' sovereignty this criterion would have to be part of the consumers' own evaluative apparatus. It thus would enable them to criticise their own and possibly others' present preferences. This would raise more urgently the question whether present revealed tastes are the appropriate representatives for what the consumers want to want. But here the problem itself becomes fuzzy. Should "improvements" be envisaged as simply broadly defined corrections within stable tastes, in which case the criticism would not be criticism of tastes but only of uninformedness; or should they be considered true taste changes? Any appearance of taste criticism from within the tissue of consumer sovereignty strikes at the foundation of the doctrine that tastes shall be the final arbiter, not subject to scrutiny.

The discussion suggests a further problem, possibly the most basic of all. Why are an individual's tastes deemed worthy of serving as a criterion of his welfare? In an earlier era his tastes could be thought to be a unique representation of what was indissolubly his. The membrane distinguishing the individual from his environment was deemed solid. Social science in the last thirty years has changed this view. Tastes, even personality itself, are now seen made and unmade by the social nexus. The bounding membrane is alarmingly porous. The tastes of an individual—even if we depreciate the effect of advertising—are not nearly so heroically his. They, and he himself, are "only" a relatively stable structure of organized interchanges with a social environment.

V. *Implications and Prejudices*

As welfare criterion, consumers' sovereignty is incomplete, highly ambiguous, and lacks independence. In order to apply it with precision, a variety of decisions must be made which are extremely complicated and at least partly normative. These conclusions modify the attractiveness of the criterion for me.

If consumers knew more, knew better, were cured, were not as gullible, they would regret many of their present choices. So the preferences they reveal on the market are "wrong" in many respects. To give them what they "truly" want, they would have to be diagnosed by authorized experts and prescribed for through a monopolization of persuasive information. The ability to accomplish this with any degree of accuracy depends on the capacities of the social sciences. It is far from clear that many individuals would entrust such a burden to the social sciences at anything like their current stage of underdevelopment.

The undesirability of the prospect stems from more than its questionable feasibility, however. As so conceived, consumers' sovereignty is antipathetic to freedom of choice. The presumed alienation of consumers' choices from their own true tastes makes it unlikely that sovereignty could be efficiently implemented by free choice. Central authoritative prescription and co-ordinated "correct" distribution is more efficient than a multiplicity of conflicting pleas for attention and idiosyncratic partly erroneous choices. Thus, one may have to choose between consumers' sovereignty and freedom of choice, or at least have to express the rate at which one would be willing to sacrifice degrees of attainment of one for the other.

Freedom of choice entails accepting the voluntary choices of consumers on whatever markets exist. Since freedom exists in degrees and is related to the range of alternatives available to choice, it will be largely illusory if the market has no responsiveness to consumer choices. A totalitarian state can reduce free choice to a triviality by presenting only a narrow and biased range of alternatives. Besides, it can resort to monopolized persuasion to change consumers' choices. Freedom of choice, no less than consumers' sovereignty, must bear up under analysis.

Yet our argument up to now lends attractiveness to it. Consumers' choices may not reflect their true tastes; but we have suggested that maybe these tastes cannot accurately be known; or that they are not really "owned" but only "loaned" tastes anyway, passed on from one person to another. What really can belong to the self and be accurately known is the experience of making and taking responsibility for choices, whether right or wrong, and seeking to know by this continuing dialogue across the permeable boundary of the self what if anything is worth preserving. It is possible that this quest, given any reasonable degree of responsiveness in the outside world, is what consumers want more than being given what they are told they really want. I suggest that when the doctrine of consumers' sovereignty was first presented, perhaps inadvertently attached to freedom of choice, an important part of its appeal rested really with freedom of choice. If forced to choose between them, our present visit may cause one to pause before automatically picking consumers' sovereignty. Might one not even actually prefer freedom of choice—the right to be often wrong, always wheedled and imperfectly hearkened to? It may be easier to hear the still small voice under the babble of TV hawkers than over the public address system.

DISCUSSION

Abram Bergson: I have only a few comments and these are directed exclusively to the papers of Professors Scitovsky and Rothenberg.

Professor Rothenberg no doubt is right to argue as he does that the principle of consumers' sovereignty may possibly mean different things, but I wonder whether ordinarily there is not sufficient agreement in usage on the essentials. At any rate, in discussions of the principle, proponents and critics alike almost always seem in accord that what is in question chiefly are several suppositions which might be stated variously but which I believe come essentially to these: First, the overt preferences of any household such as might be expressed in the market are more or less indicative of the utility the household realizes from personal consumption. Second, the utility of any household for the most part depends only on its own personal consumption as distinct from that of other people. These are understood to be suppositions about utilities which enter in a familiar way as arguments in a criterion of social welfare. The criterion in turn is taken as a basis for the formulation of normative economic principles.

Understood in this way, consumers' sovereignty has long been a subject of criticism, but lately it has been increasingly so. Although he does not commit himself to a specific formulation of the principle, Professor Rothenberg in effect provides us with a thoughtful restatement of this indictment. In view of his interesting essay, evidently Professor Scitovsky, too, must now be considered among the critics of the doctrine.

For my part, I do not see how any serious observer of the contemporary scene can fail to have some misgivings about the first supposition (if I may turn first to this aspect). But expressly or by implication Professors Scitovsky and Rothenberg are telling us here what they think good for consumers. If I understand them correctly, contrary to some who are very positivistically inclined, both consider that value criticism such as is in question need not amount only to an expression of attitudes. In some degree it may be of a more substantial and meaningful character. With this I agree, but where the criticism goes at all below the surface of things, as theirs does, it soon becomes speculative to say the least. I may not be alone in feeling that Professors Scitovsky and Rothenberg often underrate the problem that this poses for any serious inquiry.

As critics often have before him, Rothenberg focuses especially on advertising. Obviously advertising may give rise to dubious values where it misinforms, but for the rest, as Rothenberg acknowledges, the fact that changes in tastes are induced by advertising does not in itself mean that the changes are for the worse. Nevertheless, he apparently considers this is usually the case, and perhaps it is, but even one who is sympathetically inclined might hesitate to conclude so from his a priori appraisal. Thus, perhaps Professor Rothenberg is right in assuming that a desire for differentiation for the sake of prestige yields less pleasure than one where there is a genuine interest in variety, but then again perhaps he isn't.

Regarding endogenous changes in tastes generally, I wonder if it would not be useful to distinguish more clearly than Professor Rothenberg does two issues: On the one hand, that as to the extent to which consumers' overt preferences, of whatever sort they have come to be at any time, should "count." On the other, that as to the nature of the overt preferences we might wish consumers to have, and more ultimately as to the influences to which consumers' tastes might desirably be subject. The latter aspect is philosophical indeed, but perhaps economists have been wrong to neglect it as they almost always have done. But whatever is decided in this regard, no doubt many will feel that on the former issue the conclusion must still be that as a rule consumers' overt preferences should count, as consumers' sovereignty requires.

Professor Scitovsky refers particularly to the asserted superiority in regard to pleasures yielded of highbrow over lowbrow tastes, and the insufficient weight given to the highbrow tastes by a market where variety is limited by economies of scale. This calls for two comments. First, Professor Scitovsky may be right about highbrow tastes, but at the risk of demonstrating my own ineligibility to be considered as having such preferences, I must confess that I for one did not find his introspective demonstration especially convincing, although it is certainly intriguing. Second, variety may sometimes be unduly curtailed, but generally my impression is that among the more consequential vices of the market economy insufficient variety is hardly one. In any case, for the sake of clarity it should be observed that what is in question at this point is not consumers' sovereignty but a form of indivisibility affecting the market's response to this principle, which is a different thing.

The classic area where the first supposition has been questioned, of course, is that where choices are made between present and future. Neither Professor Scitovsky nor Professor Rothenberg addresses himself to this matter. In view of the great practical importance today both in advanced and underdeveloped countries of the problem of the determination of the rate of saving, this is regrettable, but I can do no more than record that I am among those who consider that Professor Pigou did not succeed especially in his attempt to establish empirically the prevalence of a defective telescopic faculty. I can imagine circumstances, however, where one might wish nevertheless to overrule overt preferences in this area.

Thus far, reference has been to the first supposition on which consumers' sovereignty rests: that the household's overt preferences are indicative of the utility it derives from personal consumption. According to the second supposition, the utility of any household depends essentially on its own consumption. This of course is impaired at once where there are external effects. Professor Rothenberg considers these important. No doubt they are rather pervasive, and sometimes I am sure they are consequential, but this is clearly a matter which must be decided separately in each case.

While I differ with the critics, perhaps I should stress that nothing that has been said argues against measures of a sort often advocated for the further dissemination of reliable information among consumers. On the contrary, I am sure that far more might usefully be done than has been done in this area. Then, too, through sales taxes or subsidies or outright constraints, in most modern communities consumers' overt preferences are often violated, and, while the grounds vary, no doubt the violation is sometimes warranted by limitations in consumers' overt preferences. Probably, too, there are still other circumstances where similar measures might be in order on the same basis. But what is suggested is that such cases are apt to be exceptional. Actually, even the critics generally hesitate to advocate any sweeping departure from consumers' sovereignty, but, as with Professors Scitovsky and Rothenberg, this usually is either because of the feeling that the individual even if wrong should be allowed to profit from his own errors or on general political grounds. I have felt it might be in order to urge that hesitation is in order also on a more basic ground; namely, the traditional one that the consumer as a rule probably knows better than anyone else what is good for him.

As Professor Rothenberg reminds us, as defined by consumers' sovereignty the criterion of social welfare is incomplete. If there are conflicting changes in utilities, alternatives must be evaluated also in the light of some principle regarding income distribution. By the same token, if the latter principle is not observed, there is at once a basis to feel that consumers' overt preferences may not indicate the social welfare realized from private consumption even if the stated two suppositions are valid. One inevitably wonders whether very often this does not give rise to misapprehensions. More particularly, while nominally consumers' overt preferences are attacked in fact it is chiefly the inequity that is of concern. If so and if through sales taxes, subsidies, and other means consumers' sovereignty is violated on this account, this is clearly an economically dubious way to deal with inequity, although the preferable alternative of changing income distribution may not always be feasible politically.

Conceivably consumers' sovereignty might prevail under alternative institutional arrangements, but in practice the principle hardly is likely to be observed unless consumers have freedom of choice and actually are allowed to register their tastes in an open market. By implication the community almost inevitably departs from the principle where consumers' goods are made available to households instead without charge as communal consumption. Recently there has been much discussion of the issue that is thus posed as to the comparative scope of and emphasis on market and communal disposition. In his essay Professor Scitovsky joins in this debate. Regrettably there is no opportunity here for me to comment systematically on this question, but I should at least record that I am among those who feel that a review of current policy in this area is in order, but must confess uneasiness as to the reasons sometimes advanced for this view. Thus, while, all things considered, I believe further allocations to communal consumption might often be desirable socially, I doubt that the case for doing so is much advanced by arguments such as the famous one of a distinguished colleague that the marginal utility of private consumption is now zero, or would be so if we abstract from advertising.

STANISLAW WELLISZ: The three essays presented at this session show that welfare economics is once again in deep trouble. Economists like to make policy recommendations without making value judgments. This singular feat can be performed only if one posits the existence of an isolated consumer endowed with immutable wants. An increase in the degree of satisfaction of wants is defined as an increase in welfare.

The concept of the sovereign consumer is reminiscent of the psychological theory of instincts which was popular over one hundred years ago. The theory was abandoned during the lifetime of our grandfathers. Economists, who perennially suffer from a cultural lag, are beginning to have some misgivings, too. Perhaps man is a social animal, and, who knows, he might be influenced by his environment.

The misgivings pose a terrible dilemma. Conventional welfare analysis stands and falls with the theory of the immutable isolated consumer. If wants can be influenced, what do we mean by the satisfaction of wants? If people live in communities and consume collective goods, how can we equalize costs and benefits to the individual consumer?

To get out of the dilemma one of three ways may be chosen. Economists may concentrate on the "positive" aspects of economics and pretend that they have no stake in policy. They may construct models with immutable, isolated consumers, and study the models instead of studying society. Or they may make value judgments and go on from there.

The paper presented by Messrs. Fisher, Griliches, and Kaysen uses a mixture of the first and second approach. The authors construct an immutable 1949 car lover and calculate how much money would have been saved if all customers behaved like the construct and if no model changes occurred since that date. The method of calculation deserves great praise. I am not sure, however, what we are supposed to conclude from the findings. Is the 1949 car lover a model for rational man? Should we freeze all tastes and all products at some arbitrary level? The authors refuse to make any value judgments, but I suspect they had something in mind. If they just wanted to calculate the cost of model changes for the sheer pleasure of calculation, surely they could have found an industry in which the job was easier to perform.

Professor Scitovsky does not construct an immutable consumer. He admits there is change, and approves of it as long as it goes in the right direction. He claims that men of good taste have a built-in compass which tells them unambiguously which is the direction of refined tastes and keener pleasures.

Personally, I am overjoyed to see Bentham dusted off. I wonder, however, whether the direction to keener pleasure is unambiguous. Professor Scitovsky tells us that he was a lowbrow and later a highbrow. He opts for food and clothing in preference to cathedrals, but prefers grand opera to either. I have on the excellent authority of Blaise Pascal and of Jean Racine that otherworldliness gives keener joys than those of refined minds and senses. The follow-the-leader game is no way out of the dilemma. We must either be forced to follow a leader, or we must accept an individual ethic. In either case a value judgment is involved.

Messrs. Scitovsky and Rothenberg remind us that individual consumption is not the only end of economic activity. Ever since Dupuit, economists have pondered how to determine the volume of collective consumption and how to apportion its costs. By now we are quite sure that the market does not allocate goods efficiently where there are externalities and that no method of voting can satisfy everyone. The realization that it is impossible to build a grandiose "community welfare function" marks the real beginning of constructive welfare economics. We can now concentrate on such important issues as the value structure of a community, the theory of fair shares, the properties of voting systems and of economic and social issues.

To my perennial surprise the statement that we cannot allocate collective goods through the market mechanism is frequently accompanied by the conclusion that we need more collective consumption. Professor Scitovsky applauds, for instance, the subsidization of off-peak railway service. Such subsidies are unjustifiable under the new welfare economics criteria. The "new-new welfare" economics also should disapprove of them. After all, must people travel for irrational reasons; so why not let them stay home and save their own and the taxpayers' money? Before we plunge into public spending, it might be wise to make some attempt to put individual and collective consumption on a commensurate basis, which is rarely, if ever, done.

If we reject the principle of consumer sovereignty, we should put something in its place, lest economics become an idle game or a tool for professional manipulators of human lives. Every policy statement rests on a value judgment; hence it might be simplest to state the value assumptions. Consumer sovereignty, for instance, is really a front for the individualistic ethic, which holds that freedom is valuable in itself. If one accepts that ethic, one must accept the freedom to offer choices, as well as the freedom to choose. One may not like the cars which are now produced or the advertising techniques, but one may uphold the right of the producers and the advertisers to offer their wares.

Value judgments are always subjective. One cannot prove that freedom is a good thing, but one cannot disprove it either. I would like to suggest that an ethical judgment is a firmer foundation for economic theory than outdated psychological concepts.

I realize that in stating these views I might conceivably influence someone to change his mind, and infringe thereby on his "intellectual sovereignty." To the majority of the audience which holds strong and immutable views, I can only quote Chesterton: "Orthodoxy is my doxy; heterodoxy is everybody else's doxy."

WILLIAM J. BAUMOL: I suspect that, with so weighty a barrage directed against it, I am moved to defend the concept of consumers' sovereignty at least partly out of sympathy for the side which is so obviously the underdog. But there is more to it. Despite the validity of many of the necessary reservations, I think the basic idea retains most of its fundamental attractiveness.

I am particularly unhappy with some of the charges which are *nearly* raised by Professor Scitovsky, though I must admit he artfully dodges committing himself on some of them. Though I do agree with almost every specific point made by Professor Rothenberg, I am also quite unhappy with the final picture which appears to emerge from his paper. For, probably inadvertently, he ends up in a role which I can only describe as complicity in assassination by over-analysis. Some of our most meaningful concepts would emerge equally shaken and apparently emasculated if they were subjected to so searching an examination of their definition, limitations, and ambiguities. For example, surely most of us would accept and endorse the statement that we are more free than is the inhabitant of a totalitarian state. Yet if we proceed to investigate this statement in terms of demanding criteria of definitional precision, an examination of the restrictions on the choices of the citizen of a democratic community and a description of the fairly considerable range of alternatives which still remains open to the inhabitant of a police state, we are likely to end up doubting that there is much validity to the assertion about our freedom. In doing so we will be right in every detail but wrong on what really matters most. Let me make it clear that I have no inherent objection to a critical examination of the concept of freedom. I think it is highly desirable to learn its weaknesses and ambiguities. But unless we remind ourselves at the end of such a study that there is a great deal of meaning—and importance—to the concept after all, we have traded off an object of great value for what, in comparison, must be considered trivia.

I think the same can be said for consumers' sovereignty. The concept is imperfectly defined; taken literally, it is an objective which in many respects can be considered dubious,[1] and its realization on the market is, at best, far from perfect.[2] And yet, I maintain it is an important and a valid concept whose significance can only be adjudged by contrast with a situation from which it is largely absent. Who of us is pleased to be told that modern painting is not available to us because only proletarian realism constitutes true art? Do we enjoy being told by the blue noses that we cannot drink, or even by the state liquor boards that we can only choose our variety of drink from their selection? I want badly to be protected from those who are convinced that they know better than I do what is really good for me and I want others to receive similar protection. When output is dictated from on high, at best the result will be something like the BBC light program which so often ends up as some Oxonian's distorted vision of what the masses really want (or ought to have). And if the decisions are not even made by men of good will, the results can be considerably worse.

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[1] Thus I am somewhat surprised that none of the papers has pointed out that the term "consumer" in "consumers' sovereignty" narrows the reference group excessively, and that, in particular, the market does well to take into account the public's desires in its role as producer. Considering the proportion of an individual's time which is typically spent at work, working conditions may be as important for his welfare as the flow of consumables which he receives.

[2] But I am impressed with the extent of Professor Scitovsky's dim view of the performance of the economy and his sanguine view of the consumer's conformity with his own preferences. I cannot agree that the market still does badly in catering extremely and increasingly to minority and exotic tastes. After all, gourmet food sections in supermarkets are increasingly widespread, a dazzling variety of classical and, indeed, esoteric phonograph records are easily available; the increasing importation of wines is helping to make them less expensive; and so on. Similarly, I question the extent of the public's agreement with Scitovsky on films and automobile design. Surely it is the intellectual Elysium of television and not the nouvelle vogue films (or even that great contribution to international culture, Brigitte Bardot) which produced troubled times for Hollywood. And I must dispute his claim that the car manufacturers were the villains of the piece and badly misjudged the public's aesthetically superior desires when they forced big cars upon it. It is much more plausible that there has simply been a change in prevailing tastes. After all, wasn't it the tailfin which seems, at least temporarily, to have brought prosperity to Plymouth?

I am not trying to deny the importance of external effects and social wants, and the need for governmental intervention to which they give rise. I am most clearly on record on this point and my conviction on the matter has, if anything, grown stronger since first I wrote about it. But it is, at least in most cases, desirable that the pattern of public intervention be designed very explicitly in terms of the desires of the public. The purpose of government interference, in a case where external effects are important, is to permit consumers' sovereignty to operate undistorted, not to suppress it. As I have stated elsewhere:

> Particularly because of the interaction of consumer demands, and also because of the existence of group or social wants which can only be satisfied at the same time, important cases can clearly arise . . . where consumer wants will not guide production. In this event the *absence* of [government intervention] may be construed to result in a vitiation of consumer sovereignty, since the individual consumer is by himself in no position to obtain the objects he desires.

My impatience is particularly aroused by Professor Scitovsky and others when they have another bash at lowbrow tastes (usually exemplified by automotive chrome and tailfins). I do not like these now passé vehicular monstrosities any more than he does. And if we are to be autobiographical, I suspect I started as lowbrow (or, worse still, middlebrow) and am now as highbrow as he. But my introspection fails to detect any net increase in my joy when I now listen to a Telemann quartet, as compared to my former, more vulgar, pleasures. My taste for Cos d'Estournel '53 has simultaneously reduced my capacity to enjoy an inexpensive California Rosé, and who is to say that I have come out ahead of the game? No doubt, primitive craftsmen who were taught by the advent of Western culture to give up their ancient stylized representations and turn to imitation of the graphic arts standards of F. W. Woolworth and Company were, like Professor Scitovsky, also moved to congratulate themselves on the improvement in their tastes.

To summarize, there is no question that the notion of consumers' sovereignty is crude and imperfect. It is equally clear that if a group of consumers is left to fend for itself in a completely unregulated market and the government avoids intervention at all costs, those consumers are likely to be very poorly served. But these caveats are insufficient grounds for us to give up the very important, if a bit charmingly old-fashioned, value judgment that the purpose of the economy is to serve the individuals who compose it, and that it is they (and not just the highbrows) who are often the best judges of their own ultimate desires.

THE REPORT OF THE COMMISSION ON MONEY AND CREDIT

AN ESSAY IN *PETITIO PRINCIPII*

By MILTON FRIEDMAN
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The Commission on Money and Credit is often compared with the National Monetary Commission created in 1908, as, for example, it is on the rear cover of the CMC report. This comparison is apt to be extremely misleading. The earlier Commission was created under different circumstances, operated under different auspices, and had a different composition of members than the present Commission. These differences no doubt account for the even greater difference in the reports of the two commissions.

The earlier Commission was created at a time of wide public consensus, crystallized by the banking panic of 1907, that something was seriously awry with the American banking system and that far-reaching reform was necessary. The public consensus that something had to be done was matched by a consensus among academic financial experts and the nonacademic financial community about the major defects of the existing system and the directions in which a solution should be sought.[1]

Given a public consensus on the need for some kind of action and an informed consensus on the kind of action needed, the political problem was to translate the informed consensus into legislation. The National Monetary Commission was created for this purpose by Congress as part of the Aldrich-Vreeland Act, which provided a temporary reform pending the recommendations of the Commission. Its membership consisted of nine Senators and nine Representatives, with Senator Nelson Aldrich as chairman and Representative Edward B. Vreeland as vice chairman. The Commission arranged for studies of foreign and domestic banking experience, held public hearings in a dozen cities outside of Washington as well as in Washington itself, had special statistical inquiries made for several foreign countries, and collected special reports for all U.S. banks which together yielded probably the richest body of data on banking that had ever been assembled. Finally, on the basis of this material, it submitted a report to Congress.

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[1] Rightly or wrongly, and as I think mostly rightly, it was widely believed that the problem was the dispersion of bank reserves and the absence of elasticity of currency issues. The elasticity that was sought and needed was not in the total money supply but in one component, currency, relative to another, deposits. The banking panic of 1907, like earlier banking panics, involved a widespread desire on the part of the public to convert deposits to currency. Given a fractional reserve system in which there was no element of currency that could be rapidly expanded on the basis of the assets that were the counterpart of deposit liabilities, it was impossible for the public to do so. The attempt, if not inhibited, could only have resulted in a sharp decline in the stock of money and the failure of banks by the droves—as a corresponding attempt did not quite a quarter of a century later. Instead the banks resorted to a concerted restriction on the convertibility of deposits into currency. We can now see that this restriction was a therapeutic measure that prevented the loss of confidence in the banks from leading to widespread bank failures and to a far worse monetary collapse than occurred. But at the time it was regarded as itself a major defect in the system and the elimination of any such restrictions in the future as a clear necessity. Rightly or wrongly, and here I believe mostly wrongly, it was widely believed that the solution to the problem of bank panics was the establishment of a central bank or system of regional central banks that would concentrate reserves and, more important, would have the power to issue additional currency that could be made available to banks to enable them readily to convert deposits into currency.

The magnitude and scope of its publications are rather interesting. Not counting its final report, the Commission issued some forty separate items varying in length from 20 to 1,162 pages and totaling 13,985 pages in all. Expenditures in producing these publications, excluding printing costs but including payments to authors, cost of clerical assistance and supplies, travel, and payment of translators, totaled $83,861.92 or $6.21 a page. Adjusted for the rough tripling of prices since then, this would amount to about a quarter of a million dollars or less than $20 a page in 1960 dollars. If this seems austere by modern standards, it doubtless reflects the absence of productivity gains in our industry and the consequent sharp rise in the relative price of our product during a half century of rapid technological improvement elsewhere.[2]

The publications were notable for quality as well as for quantity. They include a half-dozen works that have become classics: Kinley on the *Independent Treasury System,* Sprague on the *National Banking System,* Kemmerer on *Seasonal Variations,* Barnett on *State Bank and Trust Companies,* and so on—and many of the foreign authors enlisted to write about banking conditions in their countries were among the leading economists of the time. No doubt many of these works were already in process and were simply published under the National Monetary Commission imprint. But even so, the quality and quantity of the output surely testify to the limited alternatives then available to the academic economist.

These publications all appeared by mid-1911. The final report was submitted some six months later, in early 1912. It is a brief document, seventy-two pages in all, of which the final twenty-nine pages present a draft of a bill that the Commission recommends for Congressional adoption. The forty-three pages of text first describe the Commission's activities, then enumerate seventeen defects in the banking system, and then describe the National Reserve Association which is proposed as a solution. Senator Carter Glass and his associates later contended that the Federal Reserve Act as finally enacted had little in common with the proposals of the National Monetary Commission. However, even a quick perusal of the report demonstrates that Glass and his associates were simply attempting to differentiate the Democratic product from the Republican proposal. All the basic features and many of the details incorporated in the Federal Reserve Act are contained in the Commission's proposal.[3] And of course, the informed consenus of which I spoke made such an outcome inevitable.

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[2] The total expenditures of the Commission, including not only these costs but also the costs of public hearings, travel expenses of commissioners, costs of the Commission's staff, etc., was slightly over $200,000, or about $600,000 in 1960 dollars. Figures from House of Representatives Document No. 56, 62d Cong., 1st Sess., "Expenditures of the National Monetary Commission, June 5, 1908 to March 31, 1911," Letter from Secretary of the Treasury.

The present Commission was established in very different circumstances. The years since the end of World War II have seen an enhanced public concern with economic policy in most of the countries of the world. They have seen, too, a rebirth of interest in monetary matters as country after country found it necessary to abandon easy-money policies in order to stop inflation. In this country, two extensive Congressional investigations—the Douglas and Patman investigations—have been concerned exclusively with monetary policy and Congressional investigations of broader areas of economic policy have devoted much attention to monetary problems. However, this rebirth of interest in monetary problems and this widening of attention devoted to them have neither reflected nor produced a widespread public consensus that something is drastically wrong with our monetary and banking institutions. There has been and is no insistent public demand for reform.

The lack of public consensus has been matched by a lack of informed consensus. Academic and nonacademic specialists have agreed about the problems demanding attention—inflation, growth, unemployment, international payments. But there has been no consensus among them about what if any major defects characterize the existing monetary and banking structure or about what, if any, reforms are desirable. The nearest thing to a consensus was on the defects of the bond support program, which was in fact abandoned. Yet even on this problem, the consensus appears much greater in retrospect than it was at the time—many an academic and nonacademic specialist must be somewhat embarrassed when he compares his predictions about the effect of eliminating the support of bond prices with the actual outcome. There has been controversy about the role of financial intermediaries, about the maturity distribution of the debt structure, with special consideration to the so-called "bills-only" policy, about the role of rediscounting, and many other detailed matters. But if these reveal a consensus it is not about what is wrong or how to correct it but solely that our monetary and banking structure can be much improved.

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[3] See, for example, Paul M. Warburg, *The Federal Reserve System, Its Origins and Growth* (Macmillan, 1930), Vol. I, chapters viii and ix, which compare in parallel columns provisions of the bill proposed by the National Monetary Commission and of the Federal Reserve Act.

These circumstances left no place for a Commission to crystallize a pre-existing informed consensus into a practical form suitable for legislative enactment. If there was need for anything, it was for a thorough study of the operation and performance of the existing monetary and banking structure to help shape an informed consensus of the kind that must precede any radical reform. This is a far more difficult task than the crystallization of a pre-existing consensus. It can hardly be forced into the rigid mold of a definite time schedule, it cannot be guaranteed to produce objective evidence of success comparable to an agreed-on report, and it will not seem clearly relevant to current burning issues of policy.

It is therefore understandable that the Commission as actually appointed was not intended to perform this function. It deliberately avoided specialists in either the field of money in particular or academic research in general. It consisted rather of representatives of various broad national special interest groups—labor, business, and agriculture—plus a strong core of commercial bankers and representatives of other financial institutions (at least nine out of twenty-seven) plus two or three men who cannot readily be classified in any of these categories. However competent in their own areas the members might be, or however broadly informed and public spirited as citizens, such a commission is clearly not competent either to conduct on its own a serious study of our monetary structure or to direct such a study. It will inevitably seek a consensus whether there be one or not. This is the key respect in which it patterned itself after the earlier Commission—though even then, nine Senators and nine Representatives have to me more of the flavor of a group representing the public than twenty-seven men chosen to represent special economic interest groups.

The composition of the Commission has appreciably affected its recommendations. Those on interest rates offer perhaps the clearest example. The Commission's basic position on interest rates is admirable and deserves strong commendation. In general, the Commission favors a free capital market and opposes the rigging of the market by governmentally imposed ceilings on interest rates. It recommends removing the ceiling rates on long-term government securities, on mortgages underwritten by the FHA and VA, and on various agricultural credit instruments. It so happens that these are all rates on obligations which are acquired as assets by commercial banks and other financial institutions. Hence, their special interests and the general interest in a free market coincide. There is one interest rate ceiling, however, of which this is not true; namely, the present ceiling of zero on interest payments on demand deposits. This affects an item of cost to commercial banks rather than of return. This interest rate ceiling, the Commission approves. In justification of its stand, it states only that "this legislation was adopted to reduce competition for deposits among commercial banks and thereby to relieve pressure for increased earnings which led to imprudent loans and investments" (page 167).[4] This standard cartel rationalization for the prohibition of interest payments on demand deposits was bad economics and worse morality when it was put forth by Sprague more than half a century ago.[5] And whatever its merits then, the federal insurance of bank deposits makes it utterly irrelevant today. The only justification ever offered for removing temptation from bankers to dissipate their funds—even assuming that the measure would do so—was to protect depositors, not bankers. Surely there is no justification for protecting bankers from the consequences of their own imprudence. But federal insurance of deposits protects depositors far more effectively. Hence, there can currently be no case whatsoever for the continuation of governmental specification and enforcement of the maximum price banks can pay for their most important factor of production. Yet not a single member of the Commission—despite their opposition to ceilings on other interest rates and despite the undoubted opposition of many to governmental price controls in general—dissented from this recommendation! Lesson number 1 on how the solid businessman committed to free enterprise can lead us down the collectivist path.

I hasten to add that I do not believe any member of the Commission was deliberately seeking to promote the special interest he represented. No doubt each member would lean over backward to avoid such action if the conflict between special and general interest were clear.[6] The warping of the recommendations by the special interest character of the Commission reflects something very different and more subtle. First, each of us knows and is acutely aware of his own special problems; these are real and concrete; effects elsewhere are hypothetical and vague. Second, there is an enormous temptation to identify our own interest with the general interest and the man who can avoid this temptation is rare or nonexistent. As teachers, we are surely in no position to cast the first stone. How shall we interpret the readiness of so many of us to proclaim that the national interest requires higher salaries for teachers and more money for schooling, whatever its source?

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[4] This and later page references in the text are to *Money and Credit,* The Report of the Commission on Money and Credit (Prentice-Hall, 1961).

[5] See my *A Program for Monetary Stability* (Fordham Univ. Press, 1959), pp. 28-29.

[6] Since presenting this paper, I have been informed that the subcommittee which considered in detail the prohibition of interest on demand deposits contained only one commercial banker and that he was the only member of the subcommittee who opposed the recommendation for continuation of the prohibition.

Aside from its special interest character, this report is strikingly different in other respects from the report of the earlier Commission. Whereas the text of the earlier report was 43 pages long and was devoted almost entirely to stating a co-ordinated proposal for a radical reconstruction of the banking structure, the text of this one is 272 pages long—and there is an apology for its brevity in the preface—and it is devoted to a textbook-like survey of the financial structure interspersed with a large number of detailed and only loosely connected recommendations. Whereas the earlier report was published *after* the series of scholarly and descriptive studies and served to crystallize the consensus they reflected, this one is published *before* any of the studies on which it purportedly rests and indeed much of it must have been written before many of those studies were completed.

Much of the text of this report, especially when it is describing the present financial structure and its operation, is clear and informative, testifying to the competence and skill of the professional staff. Yet taken as a whole, the report is, at best, innocuous, at worst, mischievous, and I believe that this judgment reflects more than the fact that I personally favor monetary reforms that are not recommended by the Commission; I believe it is one that students of money of many different particular views will share. By attempting to present a nonexistent consensus—an attempt that is emphasized by the existence, the paucity, and the frequent triviality of the dissenting footnotes as well as by the bold-face disclaimer in the Preface—this report can only hinder the development of the kind of consensus that is a necessary foundation for satisfactory reform.

The one part of the report that has the ring of authentic competence is the final chapter, on problems of organization and administration, the one area in which most of the members of the Commission have expertness in common. In discussing the difficulty of co-ordinating policy by an interdepartmental committee "when a substantial issue is in dispute and stakes are high" (page 265), this chapter gives an analysis that applies admirably to the Commission itself and that describes accurately its own report. As the chapter says:

> The policy that all committee members can willingly and easily follow is likelier than not to be no policy at all. . . . Inevitably, and properly, each committee member interprets the common obligation to coordinate in the light of his own organization's . . . perspectives. . . . [I]f the committee is more than merely a tail on the kite of its strongest member, coordination by committee tends to produce either a stalemate of inactivity or

action only on the lowest common denominator of agreement—commonly a vague formula that plasters over real differences. (Page 265.)

Let me document by example this charge that the report mostly evades real issues. To take a trivial example from page 9, what is one to say about the sober statement: "The Commission holds that a desirable degree of economic freedom and reliance on the market mechanism for the allocation of products and resources is a continuing national objective." Not even Karl Marx could take exception to this statement; yet only two members expressed opposition to this weasel-wording. Lesson number 2 on how the solid businessman committed to free enterprise can lead us down the collectivist path. Or to take a trickier example a few pages later: "Our national policy clearly should be to avoid even mild sustained increases in the price level"—that's definite and clear enough, isn't it? But I haven't quite finished the sentence, which goes on to say: "so long as the cost in terms of other equally vital objectives is not excessive" (pages 13, 14). How is that for taking away with the left hand what you give with the right?

Sometimes, of course, a statement that is intended to be a truism turns out to have a kick in it, as, for example, when the Commission states, "if government takes specific actions to encourage and stimulate the forces for growth and to reduce the impediments to growth in the economy, it also appears reasonable to expect a somewhat higher rate [of growth]" (page 37). Does the Commission really take the will for the deed? Does it really want to commit itself to the view that the government has the knowledge and capacity to step up the growth rate in some meaningful sense? Is one to infer that the Commission regards the extraordinary rate of growth in the U.S. in the nineteenth century as having occurred in spite of free enterprise and not because of it? There is not a single dissent to this sentence. Lesson number 3 on how the solid businessman can lead us down the collectivist path. Or take the next sentence, again clearly intended to beg any real question: "A growth rate below that which is obtainable in an economy operating at a high level of employment of our human and physical resources and at reasonably stable price levels is clearly not adequate" (page 37). This needs another look. Under the specified conditions, the growth rate will be far higher if every individual saves 50 per cent of his current income and uses it to purchase directly or indirectly investment goods than if he saves 10 per cent. And the former rate of growth clearly is "obtainable" if each individual wishes to save so much. Does the Commission really mean that any lower rate is not adequate?

To turn to more serious matters, the Commission asserts that there may be a conflict between full employment and stable prices for reasons which I do not myself find persuasive. Does it face the problem and indicate how the conflict it fears should be resolved? Not at all. It plasters over what are no doubt real differences by taking refuge in the existence of "many other measures for fighting inflation and reducing unemployment simultaneously" (page 39), which will enable "reasonable stability of the price levels and low level of unemployment" to "be achieved simultaneously" (page 40).

I come to a begging of the question on a more subtle level. In its discussion of monetary policy, the Commission states that it "believes that monetary policy is a valuable and effective instrument of stabilization policy" (page 57), which is like saying that drugs are a valuable tool of medicine! But what monetary policy? The Commission distinguishes "countercyclical monetary policy" from "long-run monetary policy." "Countercyclical monetary policy," it says, "tries to time net injections or withdrawals of bank reserves so that they will best dampen fluctuations in the level of economic activity" (page 60). First, how can a "policy" try something? The policy can be that someone "tries" something. More basically, what does this statement mean in concrete terms? What specific actions should the monetary authorities take under what precise circumstances? The reader can search throughout the report without finding any answer. He will simply encounter one evasion after another.

To illustrate the extent of the evasion, consider the monetary rule I happen to favor; namely, keeping the money stock rising at a steady rate month in and month out. I believe this would be the best countercyclical monetary policy in the present state of our knowledge because I believe it would, in the words of the Commission, "dampen fluctuations in the level of economic activity" better than any alternative policy. Reading between the lines, I rather doubt that the Commission agrees with me—certainly if it did, it would have little reason to propose as it does expanding the discretionary powers of the monetary authorities. Yet I challenge anyone to find any statement in the report that spells out the Commission's countercyclical monetary policy in sufficiently concrete terms to render it inconsistent with the policy of a steady increase in the money stock. Indeed, I find it hard to conceive of any monetary policy that anybody has ever proposed that could not be regarded as consistent with the Commission's empty box. The Commission speaks of exercising "monetary restraint" at some times and "monetary ease" at others but it never defines these terms precisely; a person who read only this report would have no firm basis for knowing in retrospect whether a given policy had been one of restraint or ease; he might well be led to term some periods of steady growth in the money supply periods of restraint and others periods of ease; and even if he could specify which periods had been marked by restraint and which by ease, he would have no way of knowing on the basis of this report whether the restraint and ease had come at the proper times. All of these questions are begged from beginning to end.

The Commission is equally evasive about long-run monetary policy. Try converting into specific policy directives the following passages: "The Commission urges that the average rate of growth of the money supply should be consistent with the continued maintenance of high employment at stable prices and adequate economic growth, but it recognizes that it may be appropriate for the money supply to grow more or less rapidly than the output of the economy at high employment" (page 61) so that the "monetary authority" must provide the "proper amount of money" (page 250).

I cannot leave the Commission's section on monetary policy without commenting on one subsection beginning: "Some experts have argued that monetary policy works so slowly that its effects become perverse, because the effects of a restrictive policy are not felt until after the start of the ensuing downswing and the effects of monetary expansion until the next boom" (page 56). (Parenthetically, this failure to name names and the absence of any footnote references to relevant literature are among the more exasperating features of a document that speaks in the tones of an *ex cathedra* pronouncement yet offers no bona fides other than a list of prominent people none of whom has any special competence in the subject matter of the report. Shades of Madison Avenue endorsements!) I suspect that I know intimately at least one of the "experts" the Commission believes itself to be referring to. He assures me that the statement grossly oversimplifies his views and in the process converts his objection into a straw man. The oversimplification is clearly not intentional; the straw man can be knocked down very easily yet the Commission does not do so. If monetary policy is perverse in the sense stated, it can very easily be rendered properly countercyclical: let the authorities calculate what to do and then do precisely the opposite! Let me set the record straight by quoting from a recent publication of the expert: "I have never argued that policy actions are either necessarily or on the average perverse, though, in fact, monetary actions have been perverse on many occasions, but only that they are largely random relative to the actions that in retrospect would have been appropriate. The result is to convert actions taken for countercyclical purposes into additional and unnecessary random disturbances."[7]

Needless to say, the Commission meets the validly stated objection no more satisfactorily than it meets the straw man. It contents itself with a profession of faith that past "weaknesses reflect not inherent defects of monetary management but rather the inadequacy of the techniques employed and the criteria used for the timing of the changes in monetary policy" (page 56) without of course anywhere explaining precisely what techniques and criteria would be better.

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[7] Milton Friedman, "The Lag in Effect of Monetary Policy," *J.P.E.*, Oct., 1961, p. 464.

I have illustrated the Commission's propensity to plaster over real differences and to beg important questions with the section on monetary policy because this is both the area of my own special competence and of the Commission's major concern. This section is no exception. The same propensity is reflected in every section of the report: on debt management, fiscal policy, private financial institutions, federal credit programs, and international monetary relations. Now and then a definite recommendation does slip through, as when the Commission recommends the elimination of the 25 per cent gold reserve requirement, or the abolition of the interest ceiling on federal long-term debt. But these exceptions confirm the general rule: they are almost all with respect to those few items on which there is something approaching a consensus on the part of informed specialists.

If the Commission's resort to begging the question only emptied the report of content, it would render it innocuous but could hardly make it mischievous. Unfortunately, it does more than that. In policy matters, the easiest way to beg the question is to assign responsibility to someone else. The Commission cannot agree on a specific and well-defined monetary or debt or fiscal policy; its recommendations are that each of these policies should consist of doing the right thing at the right time in the right way; hence it is driven to recommending that particular administrative agencies have discretionary powers to do the right thing at the right time in the right way, either those they already possess, as for the Federal Reserve Board and the Treasury, or new powers, as for the President to whom they would grant the power to vary the first bracket rate of the income tax. There is a sophisticated and competent discussion of how to co-ordinate these discretionary powers. There is no discussion at all of criteria for judging after the event whether the discretionary powers have been used well or badly.

The real problems faced by the monetary authorities today—or for that matter at any time in the past four decades—do not arise and have not arisen from their having insufficient power. There is not a single example in that period of a major monetary mistake that arose from lack of power, and the Commission cites none. The real problems of the authorities are and have been what to do with existing powers and how to do it. The Commission contributes nothing but pious platitudes on these real problems. Instead, it proposes a further extension of discretionary powers and gives its benediction to the present situation in which wide, important, and overlapping responsibilities are assigned to different executive agencies limited neither by clearly defined rules for the exercise of their responsibilities nor subject to test by any clearly outlined external criteria of performance.

If the recommendations in this report were in fact carried out, the result would be the consolidation and still further expansion of arbitrary governmental power subject to no effective check. And these recommendations are urged upon the public without any even remotely satisfactory demonstration that they would in practice do more good than harm in promoting economic stability or economic growth or price stability or balance in international payments. That is why this report is both an irresponsible and a potentially mischievous document.

THE REPORT OF THE COMMISSION ON MONEY AND CREDIT

By WARREN L. SMITH
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I

In my judgment, the least satisfactory part of the CMC Report is Chapter 2, which deals with the subject of national economic goals. The Commission designated high employment, price stability, and an adequate rate of growth as the primary goals relevant to its study. Strangely—and this is a serious weakness of the chapter—balance-of-payments equilibrium (which is discussed later in Chapter 8) is not included among the primary goals in Chapter 2.

The possibility that the exercise of market power by business and labor groups may produce inflationary tendencies of the cost-push or demand-shift varieties is recognized, and the Commission points out that these types of inflation may produce a conflict between the objectives of high employment and price stability. However, the structural measures (improved employment services, programs for retraining workers, more vigorous enforcement of the antitrust laws, and so on) that are proposed, while mostly desirable and pointing in the right direction, are too general to be very helpful in assuring a workable reconciliation of the objectives of price stability and high employment. The implementation of some of these proposals would involve formidable difficulties, and it is far from certain that even a vigorous program along these lines would solve the wage-price problem. Basically, the Report fails to face up to the knotty problems posed by the Phillips curve.[1]

In its discussion of the balance-of-payments problem in Chapter 8, the Report concludes that the cost in unemployment and reduced growth would be too great to justify the use of general monetary and fiscal policy to correct a serious balance-of-payments deficit. Instead, it suggests a number of *ad hoc* measures, such as efforts to induce other countries to eliminate trade restrictions and to assume a larger share of the burdens of foreign aid, provision of more adequate credit to finance exports, and greater reliance on U. S. sources of supply in connection with our foreign economic and military aid programs. If these measures do not prove to be sufficient, the Report suggests the possibility of a realignment of exchange rates.

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[1] On the inverse relation between the percentage of the labor force unemployed and the rate of change of money wages—a relation that has come to be known as the "Phillips curve"—see A. W. Phillips, "The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1947," *Economica*, Nov., 1958, pp. 283-99; also P. A. Samuelson and R. M. Solow, "Analytical Aspects of Anti-Inflation Policy," *A.E.A. Papers and Proceedings*, May, 1960, pp. 177-94.

It seems to me that, in view of our international position and responsibilities, a more positive approach to the balance-of-payments problem would be desirable. It is important that we attempt to devise some means whereby we can control our balance of payments effectively, so that if our national interest seems to require the use of more of our resources to meet our international commitments and responsibilities, we will be able to bring about the needed adjustments in our trade and payments position. The balance of payments should adjust to the requirements of foreign economic policy rather than the other way around.

In terms of Professor Tinbergen's analysis of economic policy,[2] our basic difficulty is simply that we have four primary policy targets—full employment, price stability, an acceptable rate of growth, and equilibrium in the balance of payments—and only two policy instruments—general monetary policy and fiscal policy—which we are presently prepared to use. If the policy targets are fixed, we need two more instruments in order to be able to achieve them all simultaneously. The two instruments that suggest themselves are some means of implementing a wage-price policy and some degree of adjustability of the exchange rate. A less satisfactory solution, which we may have to adopt if we cannot or will not develop the additional policy instruments, is to regard the targets as flexible and seek to achieve the best possible compromise among them with the instruments at our disposal.

This, it seems to me, is the choice we are faced with, although, of course, we may be able to improve upon our recent performance a bit by more skillful and flexible use of our existing policy instruments. The choice is a difficult one, because there are significant costs involved in the adoption of additional policy instruments adequate to the task.

II

The most forceful recommendations of the Commission are in the field of fiscal rather than monetary policy. It proposes that Congress grant the President limited conditional power to make temporary countercyclical adjustments in the first-bracket rate of the personal income tax. On the expenditure side, it recommends that Congress enact expenditure programs for a number of years in advance, giving the executive greater flexibility in timing particular expenditures for countercyclical purposes, and that efforts be made to promote greater cyclical flexibility in state and local government expenditures, perhaps by a system of emergency short-run grants or loans, along the lines of the Clark Bill which was discussed in the last session of Congress.

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[2] J. Tinbergen, *Economic Policy: Principles and Design* (Amsterdam: North-Holland Pub. Co., 1956) and *On the Theory of Economic Policy* (Amsterdam: North-Holland Pub. Co., 1952).

Since our existing political and administrative arrangements make it extremely difficult to use the annual federal budget as an effective fiscal instrument,[3] the only ways of making fiscal policy more useful seem to be either through strengthening the automatic stabilizers or by granting limited discretionary authority to the President. The possibilities of strengthening the automatic stabilizers at the federal level seem to be rather limited unless we are prepared to adopt some kind of formula flexibility, a possibility that the Commission feels deserves further study. In view of the multiplicity of our policy goals and the possibility of conflict among them, I would prefer a grant of limited discretionary authority to the President, as proposed by the Commission, rather than formula flexibility.[4]

If stable economic growth is to be maintained, some reasonable balance between the growth of consumption and the growth of investment must be maintained on a continuing basis. When a strong expansion develops, it is likely to set off an accelerated increase in plant and equipment expenditures. This investment increases productive capacity, but in the short run its effect on aggregate demand will exceed its effect on capacity, and the result will be the generation of inflationary tendencies. If the authorities attempt to check the inflationary boom by the use of monetary and fiscal devices whose main impact falls on components of demand other than business investment (e.g., increases in personal income taxes which reduce consumption or credit controls whose main impact falls on housing), the growth of capacity may, in due course, outpace the growth of demand in important sectors of the economy, thus causing a decline in investment and possibly precipitating a general downturn in economic activity. On the other hand, if controls are available which permit the authorities to impose some check on the undue acceleration of investment, it may be possible to do a better job of maintaining a continuing balance between demand and capacity.

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[3] The clumsiness of our budgetary machinery is well brought out by a contrast with the situation that prevails in Britain. The Prime Minister ordinarily presents his budget to Parliament in the early part of April, shortly *after* the beginning of the fiscal year to which the budget applies. This makes it possible to formulate the budget with a much better idea concerning the economic outlook and problems during the period to which the budget applies than is possible in this country. Moreover, the British budget is a comprehensive financial plan covering both expenditures and taxation, and the budget as a whole is formulated with a view to its effect on the economy. Finally, unless a major political crisis occurs—which is most uncommon—the British parliamentary system insures that the budget as presented by the government will be acted upon promptly by Parliament and put into effect without significant change.

[4] One kind of formula flexibility would relate the schedule of personal income tax rates to the extent of divergence between the level of gross national product felt to be consistent with full employment and the actual prevailing level of gross national product. Although the administrative details would require considerable thought, the adoption of such a system would not introduce any revolutionary new principles into our tax system, and the potential gains from its introduction appear to be sufficiently large to justify its serious consideration and study. For an estimate of the effectiveness of a device of this type during recession and an estimate of the budgetary cost involved, see J. S. Duesenberry, Otto Eckstein, and Gary Fromm, "A Simulation of the United States Economy in Recession," *Econometrica*, Oct., 1960, pp. 766-68.

Unfortunately, general monetary controls do not seem to be very effective in influencing business investment, at least in the short run. The Commission recognizes this and recommends that the possibility of developing selective credit controls capable of influencing business investment be investigated. However, no specific suggestions are made in this regard, and I am skeptical whether effective selective controls can be developed.

In view of the importance of being able to exert some control over investment, I wish the Commission had considered in its Report the possibility of developing a fiscal device for this purpose. Even if monetary policy were—or could be developed into—an effective instrument for controlling business investment expenditures, it would still be desirable to have some kind of flexible fiscal device which would also be capable of influencing such expenditures. If, as now seems possible, we are to be faced from time to time with balance-of-payments difficulties, we may frequently find it necessary to follow a restrictive monetary policy in order to raise domestic interest rates in relation to those prevailing in foreign centers to prevent an outflow (or even induce an inflow) of short-term capital for the purpose of protecting our gold and foreign exchange reserves. At times, such a restrictive policy, unless its domestic effects could be offset in some way, might tend to curtail business investment when such a curtailment was inappropriate from the standpoint of domestic stability. Under such circumstances, if an effective fiscal device were available which could be used to stimulate investment, we would have more room for maneuver in our efforts to achieve internal and external stability simultaneously.

If a credit against income taxes for amounts spent on business investment, along the lines of the proposal advanced by the Administration in the last session of Congress,[5] were to be put into effect on a more or less permanent basis as a means of stimulating investment in the interest of long-run growth, I can see no reason why the percentage of tax credit allowed could not be varied countercyclically as a means of controlling business investment spending. Since changes in the percentage of tax credit allowed have an effect similar to changes in the initial cost of capital equipment, the incentive effects should be strong enough to exert a significant effect on the timing of investment outlays. In order to provide the necessary administrative flexibility, it would be necessary for Congress to grant the President some authority to make discretionary changes in the allowable tax credit. The chances that Congress would agree to the delegation of such authority to the President are, I suppose, rather slight, but given our unsatisfactory procedures for formulating the annual budget, any significant improvement in the instruments of stabilization policy will probably require the delegation of authority to the President. A cyclically variable investment tax credit, if used infrequently and with care, would, I believe, increase the effectiveness of stabilization policy.

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[5] For an explanation of the Administration proposal, see *President's Tax Message along with Principal Statement, Detailed Explanation, and Supporting Exhibits and Documents,* submitted by Secretary of the Treasury Dillon at Hearings conducted by the Committee on Ways and Means, House of Representatives, May 3, 1961 (Government Printing Office, 1961).

The recommendations concerning monetary policy in the Report are not very exciting. I would like to see some experimentation with secondary reserve requirements applicable to commercial banks as a means of preventing destabilizing shifts in the composition of bank portfolios, and I believe it would be desirable to tie the discount rate to the Treasury bill rate in order to get rid of the perverse announcement effects that are often produced by changes in the discount rate under the present system. Both of these proposals were considered and rejected by the Commission. On the other hand, I believe the Report is correct in opposing the extension of credit controls to cover nonbank financial intermediaries, since there is little evidence that the activities of these institutions have weakened monetary policy significantly. The Report recommends the elimination of the ceiling interest rates on FHA-insured and VA-guaranteed mortgages. Since residential construction is the one sector where there is clear evidence that monetary policy has exerted a stabilizing effect on the economy and since this effect seems to be to a considerable extent due to the interest rate ceilings, it would probably be unwise to eliminate the ceilings unless an effective system of selective controls was imposed to take their place.

The so-called "bills-only" policy of the Federal Reserve has always seemed to me to be an unwise self-imposed restriction on the System's freedom of action, and I am glad the Report recommends its elimination. At the same time, I believe the ability of the monetary authorities to establish a structure of interest rates substantially different from the structure that is consistent with the expectations of investors is commonly rather limited unless the authorities are prepared to act on a very large scale. It would be a mistake to expect any miraculous improvement in monetary policy as a result of the elimination of the "bills-only" policy.

III

The Commission adopts the view that there are many combinations of monetary and fiscal policies which will produce any desired level of aggregate demand and that the choice of policy mix should be made with a view to achieving an optimum allocation of resources among private consumption, private investment, and the production of government services. The burden of the debt is held not to be a sufficiently serious matter to justify placing any emphasis on debt retirement as a policy objective. As a result of the Commission's approach to the question of policy mix, the Report is completely free from the conventional injunctions about the need to balance the budget as an end in itself—indeed the phrase "balanced budget" does not appear anywhere in the Report. The budget surplus or deficit and the resulting change in the public debt are simply resultants of the basic decisions concerning policy mix.

The Commission's view concerning growth is that if we succeed in achieving full employment and a stable price level, we can expect a rate of growth in the range of 3.5 to 4.5 per cent per annum. By a proper policy mix, it may be possible to increase this rate somewhat. The proper policy mix for promoting growth would be one emphasizing a tight fiscal policy to generate budget surpluses which would constitute an addition to national saving, combined with debt retirement to make the resulting funds available to the capital market to finance private investment. The Report recognizes that funds put into the capital market through debt retirement will not always result in equivalent private investment. Consequently, debt retirement will need to be supplemented at times by an easy money policy and perhaps also by fiscal measures to increase investment incentives. Indeed the Report points out that such a growth-oriented policy should be pursued with caution, since investment may not respond in the desired manner, so that such a policy may result in inadequate aggregate demand and thus produce unemployment and underutilization of existing capacity rather than accelerated growth.

It should be pointed out (although the Report does not go into this matter) that the balance-of-payments problem is relevant to the question of policy mix and economic growth. If we are faced with a continuing balance-of-payments deficit of not too serious magnitude and are unwilling to make the basic readjustments (for example, in our exchange rate) to eliminate it, we may be able to deal with the situation by a skillful use of financial policy. Basically, this would call for a level of interest rates that, on the average, would be higher relative to interest rates prevailing in other financial centers than would be required in the absence of the payments deficit. The policy of high interest rates could be supplemented by other measures, such as the issuance of a special security paying a premium interest rate (and perhaps covered by a gold guarantee) which would be made available to foreign central banks and official agencies, and by Treasury operations in the forward exchange market from time to time.[6]

To the extent that a restrictive monetary policy designed to deal with the balance-of-payments problem tended to cause undue restriction of domestic activity, its effects could be offset by an easing of fiscal policy through reduced taxes or increased government spending. However, a sustained high interest rate policy would curtail investment to some extent and thus have an unfavorable effect on growth. That is, the cost of using the monetary-fiscal mix to deal with the balance of payments would be the foregoing of its use to stimulate growth. This could be corrected for, however, by making appropriate changes in the tax structure to strengthen investment incentives.

Simplified growth models of the Harrod-Domar type, which assume a constant marginal capital-output ratio, lead toward the conclusion that an increase in the fraction of national resources devoted to capital formation (i.e., in the saving ratio) will raise the rate of growth of income more or less proportionately. However, more sophisticated and realistic models of the growth process suggest a less important role for capital formation. Indeed, if aggregate output is governed by a Cobb-Douglas production function with constant returns to scale and allowing for neutral technological change, a once-and-for-all increase in the saving ratio has no effect on the equilibrium rate of growth. According to this model, which is quite consistent with the historical pattern of growth in the United States, a growth rate of about 3½ per cent can be expected with a constant saving ratio, if past trends of technical change and labor force growth continue. To push the growth rate up to 4 per cent by increasing investment alone would require that the stock of capital grow at a rate of about 5 per cent, which means that a continuously increasing fraction of income would have to be devoted to net capital formation.[7]

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[6] For a good discussion of operations by the monetary authorities in the forward exchange market, see J. H. Auten, "Monetary Policy and the Forward Exchange Market," *J. of Fin.*, Dec., 1961, pp. 546-58.

[7] The production function is

$$Y = Ae^{gt}K^{a}L^{1-a}$$

where Y is income, K is capital, L is labor. Differentiating with respect to t and dividing through by Y, we obtain

$$\frac{\dot{Y}}{Y} = g + a\frac{\dot{K}}{K} + (1-a)\frac{\dot{L}}{L}\cdot$$

Even on the basis of such a model, it should not be concluded that efforts to stimulate private investment are not important, however. For one thing, it seems clear that the proportion of national resources going into net capital formation has been declining in recent years, and if such a trend continues, it may pull the growth rate below the 3½ per cent level. Furthermore, a once-and-for-all increase in the saving ratio will raise capacity, even though it may not raise the equilibrium rate of growth. Finally, it may be noted that an increased pace of capital formation may itself stimulate the introduction of technical change, so that the above analysis may understate the importance of capital formation as a source of economic growth.[8] At the same time, it appears that we should not expect miracles from measures designed to stimulate investment.

The CMC Report recognizes that technical change is an important source of economic growth and accordingly recommends a vigorous program of public investment, including expenditures on education and research, as well as efforts to encourage private spending on research and technical development. It also suggests that if we are successful in operating the economy more nearly at capacity levels, this may in itself tend to accelerate growth, but I am inclined to think that any gains from this source would probably be largely of the "one-shot" variety which would raise the base of the growth curve without affecting its slope very much.

IV

The Commission's recommendations for reorganizing the Federal Reserve System are, in my opinion, generally desirable. However, the proposals concerning the chairmanship of the Board of Governors, as I interpret them, would not assure a newly elected President of having a chairman in sympathy with his economic philosophy and program. In the interest of integrating monetary policy effectively with other

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For the period 1909–49, R. M. Solow ("Technical Change and the Aggregate Production Function," *Rev. of Econ. and Statis.*, Aug., 1957, pp. 312–20) has estimated g (the rate of technical change) as having an average value of about 1.5 per cent and a as .35. The average expected growth of the labor force ($\dot{L}/L$) for 1961–70 is about 1.2 per cent (see *Population and Labor Force Projections*, Bull. No. 1242, BLS, June, 1959). Substituting these values in the above expression, we obtain

$$\frac{\dot{Y}}{Y} = .35\frac{\dot{K}}{K} + .023.$$

If capital and income grow at the same rate ($\dot{Y}/Y = \dot{K}/K$), this gives $\dot{Y}/Y = .035$—i.e., with a constant saving ratio, the equilibrium rate of growth of income is just under 3½ per cent per annum. If $\dot{Y}/Y$ is .04, $\dot{K}/K$ would have to be .049. For a calculation very similar to this, see W. H. L. Anderson and John Cornwall, "Problems of Growth Policy," *Rev. of Econ. and Statis.*, May, 1961, pp. 167–69.

[8] In the terminology of footnote 7, g may depend upon $\dot{K}/K$.

aspects of the government's economic policy, it seems to me that the President should have this assurance.

As a matter of fact, my own preference would be for a more radical change, under which the Board would be replaced by a single administrator who would serve at the pleasure of the President. This would eliminate the so-called "independence" of the Federal Reserve, which I believe is basically undesirable. Administration by an "independent board" does not seem any more appropriate for monetary policy than for national defense or foreign policy. There is not just one "correct" monetary policy that should be followed. The proper monetary policy under given circumstances depends upon the fiscal and other policies that are being followed and the priorities attached to the different and partially competing goals the government is seeking to achieve or reconcile—such as high-level employment, price stability, growth, balance-of-payments equilibrium, and so on. Monetary management therefore involves questions of policy at the highest level. It is a perfectly legitimate subject for political parties to concern themselves with—indeed they would be derelict in their duty to the nation if they failed to do so. The citizen who does not like the way monetary policy has been conducted, either because he disagrees with the priorities attached to the various objectives or because he thinks the controls have been ineptly administered, should have an opportunity to express his disapproval at the ballot box. Those who conduct our monetary policy should stand accountable to the electorate for what they do. Under present arrangements, this accountability is very remote and indirect, and the lines of responsibility are by no means clear.

REPORT OF THE COMMISSION ON MONEY AND CREDIT: A COMMENTARY

By RALPH A. YOUNG
Board of Governors of the Federal Reserve System

Selecting a focus for this commentary on the Report of the Commission on Money and Credit is not a difficult task. This is, after all, a meeting of economists. At such a meeting, the total utility of participants is maximized by concentrating on the monetary economics—explicit and implicit—of the Report, leaving to our fellow professions the questions of political and administrative structure raised by the Commission. In this way, we may avoid the fate that has befallen the release of the Commission's report to the public; namely, an overplay of Commission recommendations as to structural changes and an underplay of its appraisal of our financial mechanism.

The Commission is to be commended for addressing itself directly to the principal questions that economists and others have been asking in recent years about the role and efficacy of monetary policy. Are the several goals that monetary policy is being called upon to pursue mutually compatible? Is monetary policy effective at all? If it is, is it effective only after too long a lag and is its effectiveness too often perverse? Can it be made to operate effectively within reasonable time periods and within tolerable social bounds? Does monetary policy have undesirable side effects, such as discrimination among classes of borrowers or regressive impact on the distribution of incomes?

The Commission's stand on each of the central issues is surely the basic substance for discussion at a professional meeting such as this one.

With respect to the goals of all governmental financial policies, the Commission concludes that simultaneous achievement of an adequate rate of economic growth, low levels of unemployment, and reasonable price stability are in the main compatible, if, to use the Report's words, "we do not expect the impossible for each." Those of us who have never subscribed to the Slichterian hypothesis that creeping inflation is a prerequisite to, or at least a necessary concomitant of, growth are naturally gratified by this conclusion. If I have any dissatisfaction with the Commission for so concluding, it is mainly because the analysis supporting it is less extended than might be desired. My own studies lead me to the conclusion that reasonable price stability will prove in fact to be essential to attaining other goals, particularly in sustaining adequate and equitably shared growth, but the Commission itself reads the historical evidence more cautiously.

As for the role of monetary policy among the complex of powers available to the government in achieving the broader public goals set forth by the Commission, the monetary authorities themselves have generally been far more modest than many of their critics in defining the scope appropriate for their policy. It is comforting, therefore, to find the Commission convinced that the burden of countering economic cycles and fostering growth must be shared among monetary policy, fiscal policy, debt management, and other governmental powers and—importantly—private policies with respect to wages and prices.

In placing monetary policy in perspective with respect to other stabilization tools of government, however, the Commission does rank it high in effectiveness. In assessing its countercyclical role, the Commission probes especially into the impact on and diffusion through the economy of restrictive monetary policy.

The Commission's favorable appraisal of counterrecession monetary policy does have one curious omission. The Commission emphasizes particularly the increased responsiveness of the economy to policies of monetary restraint as a consequence of the "wringing out" of excessive liquidity over the past decade. But the Commission refrains from noting that this development has also made the economy more responsive to stimulative monetary action.[1] Surely, the promptness of recovery from the 1958 and 1961 recessions must in some measure have reflected the changed liquidity position of the economy from earlier postwar recessions as well as the speed with which remedial monetary actions were taken and the resulting countercyclical swelling of the economy's liquidity.

On balance, the section of the Report dealing with stimulative monetary policy in recessions suggests a too ready acquiescence in the "liquidity trap" and "pushing on a string" criticisms of monetary policy. These arguments might have been more relevant to the depressed thirties than they have been to the late fifties and early sixties. And surely the sixties as a whole are more likely than other recent periods to be characterized by strong effective and latent investment demands stemming from burgeoning technology, world-wide expansion in population and demands for rising living standards, large and rising drafts on the economy's output for local community and national needs, and continuing competitive business demands for ever more efficient means of production.

Criticisms of countercyclical monetary action considered by the

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[1] See, for example, the evidence presented by Bernard Shull in "Pushing on a String—Then and Now," in the *Bus. Rev.* of the Fed. Res. Bank of Philadelphia, Sept., 1961.

Commission relate especially to the differential effects of restrictive policy. Various Commission studies were directed to these criticisms and the weight of evidence assembled was apparently favorable, or at least not too adverse, to monetary policy.

With regard to the impact of monetary policy on the distribution of income, the Commission concludes that any differential effects on borrowing sectors or interest-receiving sectors are not such as to warrant limiting the use of monetary policy as a countercyclical force.

The next charge examined by the Commission is that monetary policy works so slowly that its effects are cyclically perverse, and it finds this allegation not supported by the evidence. The Commission admits the evidence is sparse and inconclusive.

Evaluating time lags between monetary action and the economy's aggregate expenditures is indeed a complex and subtle problem. That changes in policy must begin in good time is not to be denied; there cannot help but be an important projection element in flexible monetary policy.

Monetary policy changes, however, are rarely intended to induce abrupt and substantial shifts in economic activity. The virtue of monetary policy that appears to excite the Commission's special admiration —its flexibility in direction and degree of intensity—may contribute to the appearance, but not the substance, of a lag. Changes in the direction of policy are usually intended to have their effects marginally and without creating wide gyrations in financial markets and, consequently, on expenditures. What may therefore appear to be a time lag between the initiation of a shift in policy and a marked effect on aggregate expenditures is often in reality the progressive restraining or easing effects that have been sought.

Besides the difficulties in gauging the response pattern of aggregate demand to monetary action, there is the further difficulty that lead times in the planning and financing of expenditures differ markedly among types of outlays, at different stages of the cycle and as among different classes of spenders. Then, there is the uncertainty that expectational reactions may touch off a chain reaction of responses affecting current attitudes as well as future plans long before any change can be observed in aggregate income and expenditure.

Lastly, at any point in time many other influences are at work along with monetary policy, and disentangling the complex so as to identify the time span between a policy change and a change in a specific category of expenditures can involve heroic assumptions and imputations of behavioral reactions and relations. Thus, it hardly comes as a surprise that the Commission, in appraising the effectiveness of monetary policy, does not subscribe to a specific pattern of time lags.

The Commission suggests that whatever lags exist can be shortened by certain changes in operating policies, specifically by influencing directly the interest rate structure through open market operations in the entire range of maturities of government obligations, when domestic or international considerations warrant. The fact remains that only markets for short-term government securities have the capacity to handle the volume of open market operations necessary for most short-run reserve adjustment purposes, and, therefore, the short-run capacity of monetary policy to alter relative supplies of short- and long-term securities in the market is limited. Moreover, cyclical responses in both long- and short-term market rates have usually occurred with equal promptness.[2] The principal difference in their respective reactions has, of course, been a matter of degree.

For a combination of international and domestic reasons, the Federal Reserve has operated during the last year throughout the range of maturities. While one may acknowledge the balance-of-payments usefulness of this change in policy, it is premature to judge whether and how the change in operating practice in itself—as distinguished from the over-all effect of increased reserve availability—has helped to accelerate the economy's prompt and vigorous rebound from moderate recession.

The purported lag between policy action and economic effect, together with the difficulty in projecting economic fluctuations, have been among the reasons that various economists have advocated surrender of discretionary policies to some mechanism that would provide automatically for steady growth in the money supply. The Commission does not subscribe to this "throwing out of the baby with the bath water," nor, needless to say, do I. My reading of the historical record does not suggest that steady monetary increments possess great advantage over the actual discretionary changes made, and in given situations, automatic increments could have been a cause of much, indeed grave, trouble.[3] Under the circumstances, I leave it to my distinguished colleague on this panel to quarrel on this score with the position taken by the Commission.

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[2] See, for example, "A Closer Look at Interest Rate Relationships," *The Morgan Guaranty Survey*, Apr., 1961, and Ralph A. Young and Charles A. Yager, "The Economics of 'Bills Preferably,'" *Q.J.E.*, Aug., 1960, pp. 341-73.

[3] In the Feb., 1961, *J.P.E.*, Martin Bronfenbrenner presented an ingenious aggregative statistical framework for testing the relative performance of discretionary (actual) versus automatic-increment monetary policy over the period 1901-58. While his weighted statistical syntheses over the entire period favored the policy of automatic monetary growth, discretionary policy was found to have performed conspicuously better than the automatic approach in both the thirties and after World War II. Such opposed findings are reconciled when one discovers that the half-century comparison is swung in favor of automatism by the weight of the six years of price and credit inflation between 1916 and 1921. These years set aside, the evidence would appear to endorse discretionary monetary policy. Other groupings of the data, of course, may suggest still other conclusions. It is evident that judgments in this area need to be conditioned by the details as well as by the broad comparisons.

Again on the question of effectiveness, the Commission denies that monetary restraint is frustrated because rising turnover or use of money offsets attempts to restrict growth in the money stock. As the Commission concludes—and rightly in my judgment—the monetary authorities do have quite enough power to compensate for changes in velocity by limiting growth in the money supply. Increases in velocity, it is well to remember, result in part from rising interest rates, which is one of the channels through which a restraint on borrowing and spending becomes effective.

Much attention has been focused in recent years on the role of nonbank financial institutions in contributing to cyclical and secular movements in velocity. It has been asserted that the activities of these institutions result, in effect, in an offsetting of monetary policy, as they activate idle demand balances by offering higher returns on savings and by selling securities to holders of idle balances.

The Commission's analysis agrees with what we have observed at the Federal Reserve Board; namely, that the empirical evidence does not support such generalizations about the influence of nonbank institutions on velocity, particularly in the past decade. If anything, funds appear to be attracted to these intermediaries in greater volume in periods of recession, when market interest rates happen to be relatively low, and less rapidly in periods of relatively high interest rates.

The Commission is somewhat less positive with respect to the secular movement of velocity, observing that there is disagreement as to the importance of the role of nonbank institutions in bringing about the postwar rise in velocity. In view of this and on the basis of its analysis of cyclical movements, the Commission wisely concludes that there is no current need to subject nonbank financial institutions to some special apparatus of control as a supplement to, or reinforcement of, the usual measures of monetary policy.

The Commission invested much intellectual effort in developing a neat comprehensive and integrated program for improving the operations of thrift institutions, including the savings departments of commercial banks. Essentially, the CMC recommendation would equalize the positions of the various types of thrift institutions with respect to taxation, competitive areas, liquidity requirements, interest payment restrictions, and other attributes and then let them fight it out for the consumer's savings dollar.

Our present structure of federal and state regulation undoubtedly does result in greater advantages for some types of institutions than for others, and much can and should be done to remove inequities. A passion for neatness, however, should not be permitted to blind us to the real structural problems, some of which could not be solved and might be aggravated by the Commission's proposal.

In the case of commercial banks, the traditional American view is that freedom to compete for long-term savings cannot be allowed to reach excesses that might threaten the solvency of the principal liability of commercial banks and main focus of monetary management; namely, demand deposits. One wonders whether it is logical to subscribe to a complete prohibition on payment of interest on demand deposits, as does the Commission, on grounds that such limitation is needed to prevent imprudent bank lending policy, and at the same time advocate complete freedom for commercial banks to compete for savings and time deposits.

Likewise, it is highly debatable whether the reserve requirement against time deposits should be removed. This particular piece of harness is a long-established one; its function is to serve as partial restraint on the time deposit competitiveness of commercial banks. And further, both banks and deposit holders need to keep in mind a sharp distinction between the liquidity of time deposits and that of demand deposits. Any asset holder would obviously prefer interest-bearing to noninterest-bearing cash. If monetary regulation is to be effective, steps need to be avoided that risk encouraging banks to emphasize to holders the liquidity of time deposits relative to demand deposits.

Thus, the Commission's solution to the problem of the dual nature of the commercial bank does not simultaneously meet the tests of equity, liquidity, and solvency. The monetary authorities, on the other hand, have a responsibility for seeing that all three tests are met. And they have the further responsibility of looking to the effects of commercial bank actions on the total liquidity of the economy.

Turning now to the parts of the Report dealing with international aspects of monetary policy, I must confess to some dissatisfaction both with the analysis and with the consequent conclusions. For one, the Report fails to deal directly with the problems of grave import to the United States by virtue of the dollar's role as a reserve currency. The fact is that this position influences U. S. financial policy in two vital respects. In the first place, it obliges the U. S. to take special care in avoiding policies that may have disturbing effects on flows of international payments. Secondly, it precludes the U. S. from looking to exchange controls or even to devaluation as alternatives for dealing with an obstinate balance-of-payments deficit.

These limitations are indeed quite stern, but we do have to live with them. They mean that we must increasingly assess our policies from the standpoint of international implications, and that we must also increasingly expect international reaction to them.

The Commission's first concrete balance-of-payments recommendation states "that the costs in terms of unemployment and lower growth would be so great from trying to correct our balance-of-payments deficit by general monetary and fiscal policies that alternative means should be sought to achieve the necessary balance."

What the Commission means by this sentence is not completely clear. One can agree that deflationary monetary and fiscal policies are inapplicable in a situation in which the United States is in payments deficit externally while suffering domestically from unemployment of labor and capital. I trust, however, that the Commission does not want to deny that anti-inflationary (as distinguished from deflationary) monetary and fiscal policies are not only applicable but also vitally important to avoid any increase in a payments deficit that would inevitably result from resumption of inflationary tendencies.

On the other hand, no student of the subject would deny that there are cases of payments imbalance not correctable by fiscal and monetary policies alone. It would have been helpful if the Report had been more explicit about the policies regarded as more effective than fiscal and monetary measures, and especially about the prospective influence of such policies on the four major areas of the U. S. balance of payments; i.e., current private transactions, government transactions (including military expenditures and foreign aid), private investment, and movements of private short-term capital (including both recorded and unrecorded transactions). If the Report had spelled out these matters, it might have found that well-chosen fiscal and/or monetary actions—depending, of course, on the developing situation—could play a helpful corrective role.

The Commission rightly emphasizes that "surplus countries as well as deficit countries have a responsibility for the world payments problems." The Commission's positions on the need for a firm dollar price for gold and that our gold reserve must be freely available to meet international payments needs are also correct in my view. It is debatable, however, whether elimination of the gold reserve requirement against Federal Reserve notes and deposit liabilities would greatly increase foreign confidence in the dollar. It is surely much more important that our national policies be such as to re-establish and maintain an equilibrium in our balance of payments, quite apart from the reserve ratio.

I find it hard to concur in the Commission proposal that "the IMF should be encouraged to take more initiative in recommending and effecting changes in the exchange rate structure." The Report itself recognizes that discussion of such changes "will generally cause disturbances in exchange markets." Considering the volatility of speculative funds, this proposal might well open up a Pandora's box. One may properly remain skeptical about its practicability.

Needless to say, one can accept without quarrel the Commission recommendations to strengthen existing multilateral arrangements, to improve co-operation among central banks, and to increase the resources of the IMF, especially by means of a stand-by "borrowing arrangement." The latter task is now an accomplished fact.[4]

At the outset I noted that my comments would focus on only those matters in the Commission's Report that relate to the economics of domestic and international monetary policy. On these parts of the Commission's Report, and notably its appraisal of the role, tools, and impact of monetary policy on the domestic scene, there is much to be commended. Certainly, the Commission's findings clarify or put in sharper perspective central points of contemporary monetary controversy: The goals of public policy—adequate growth, low unemployment, and reasonable price stability—are not found to be incompatible. There does appear to be a role, after all, for discretionary monetary policy in both contracyclical stabilization and long-run growth. Policy is not inherently frustrated by increases in velocity, by the high levels of business income taxes, or by the pro-cyclical behavior of nonbank financial intermediaries. Moreover, monetary policy does not appear to be unduly discriminatory in its economic incidence among classes of borrowers.

With respect to the tools of monetary policy, the Commission recommends retention of fractional reserve requirements, changes in which should be made sparingly; a fully discretionary, nationally uniform rediscount rate and rediscounting policy; and open market operations in the full range of maturities when warranted by domestic or international considerations. These are hardly radical recommendations. With regard to the discount instrument, the Commission chose to ignore or did not take pains to inform itself fully about the extent to which the System has already accomplished a practical uniformity in discount rates and policy. On the issue of additional selective credit controls, the Commission rejects extension of the areas subject to this type of credit restraint. I would not take issue with this conclusion.

My principal reservations with respect to the economics of the Report are the apparently inadequate recognition of the unique role of commercial banks as both creators of money and mobilizers of savings and transactions reserves, a superficially reasoned acceptance of some panaceas for strengthening international confidence in the dollar, and a failure to grapple enough with the stubborn difficulties afflicting our over-all balance-of-payments situation.

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[4] It may be noted that the Report seems to suffer from the misapprehension that a country's drawing rights under the IMF Agreement are limited by its quota. Actually, all the limitations contained in the Agreement (Article V, Section 3, a, iii) can be waived (Article V, Section 4) so that in fact a country's drawings are limited only by considerations of the country's own position and by the resources of the IMF as a whole.

The major difficulty I have in comprehending the Commission's Report is the jump it makes from the economics to the political science of its recommendations. As I read it, the Report vindicates almost in entirety the economic rationale on which monetary policy has been formulated over the past decade and, in large measure, the tools through which it has been effectuated.

Why, then, the need for proposing such basic changes in the political and administrative structure of the Federal Reserve System? Though the proposals are individually small, in sum they could materially alter the character, and ultimately the philosophy, of the U. S. monetary administration. If one subscribes to the Commission's conclusions that the existing philosophy and its means of execution have been substantially correct in the postwar period, one naturally hesitates to concur in a need for radical change in organizational structure.

Every public institution should be subject to recurrent review as to function and organization, and the Commission has rendered a highly useful public service in making its review. Each organizational proposal that is advanced must, of course, be weighed on its own merits. But the perspective in which the weighing is done must include the broader purposes, scope, and processes of monetary policy.

In suggesting earlier that consideration of this aspect of the Report might be left for another time and another audience, I did not mean to imply that economists should waive their right to assess the economic implications of political proposals. Rather, they must emphasize economic criteria in assessing the desirability of fundamental structural change in our existing central banking institution.

DISCUSSION

ROMNEY ROBINSON: My comments may perhaps reduce to the complaint that Mr. Young's paper reads perhaps a little too predictably like that of an economist whose views correspond to those of the Federal Reserve and Mr. Friedman's paper too predictably like that of an economist whose views correspond to those of Milton Friedman. I cannot refrain from saying what a memorable occasion this would have been had the two—just for this once—exchanged views, so that we had a Young paper markedly influenced by Friedman views, and a Friedman paper strongly reflecting the Federal Reserve position.

I was looking forward with some anticipation to Mr. Young on the subject of Federal Reserve reorganization, and it was a cruel disappointment to have him banish this topic to the area of political science. Perhaps he is right that the topic is not appropriately discussed at this meeting. But I doubt very much if it is going to be discussed at any other professional gathering. We may do this sort of thing badly, but we are the only people likely to do it at all. And I am reminded that Allan Sproul, in a memorandum to the Joint Economic Committee,[1] felt no such inhibition. Sproul is explicit as to the proposals for structural change he approves and those he does not. He would not object to Presidential power to appoint a Chairman from among the Federal Reserve Board membership. But he balks at the proposal that the handling of open market operations be vested in the Board rather than the Open Market Committee, because he thinks this change would make for a less competent operation. Now if political changes are going to have economic effects, then they belong within our considerations here—and we would properly resent it very much if the conclusions were left to clumsy-handed political scientists. On structural changes, I wish Mr. Young had risen to the bait; but he did not. All we know is that he disapproves. We do not know which proposals he dislikes, or dislikes most; nor do we know why he dislikes them.

The Report finds that monetary policy has a useful and important part to play, and Mr. Young agrees. It would have been a matter of some surprise had he disagreed. The Report has some minor misgivings as to the effectiveness of monetary policy in recessions and over the question of lags. Again, it is not very surprising that he should have felt this emphasis on limitations to be a little overplayed. But it is not until we reach international monetary affairs that we get a really qualified agreement.

The CMC view, in summary, is that it is desirable and probably necessary for the United States to retain its position as a reserve currency country. Hence it should stand firm on such matters as the present dollar price of gold; it should behave, in short, with that extreme degree of circumspection required of bankers, including central bankers. But tucked away in this part of the

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[1] *Review of Report of the Commission on Money & Credit;* Hearings Before the Joint Economic Committee, Aug. 14-18, 1961 (Washington, 1961), p. 479.

Report are some interesting qualifying words, phrases, sentences, the meaning of which is sometimes unclear, but which might be interpreted, for example, as an argument for dollar devaluation in extreme circumstances. Mr. Young, if I interpret him correctly, is suspicious of these little qualifiers and wants no part of them. Accordingly, and quite reasonably I think, he is in effect saying to the Commission: "You reject the classical deflationary medicine as a remedy for balance-of-payments difficulties. But you are not explicit at all as to alternative remedies. What did you have in mind?"

Mr. Young's own position is more unequivocal: this country is and must remain a reserve currency country; hence it is entirely precluded from looking to exchange controls or devaluation. To quote him: "These limitations are indeed quite stern, but we do have to live with them." The only difficulty here is that once the CMC's guilty secrets, if any, have been pried out, the CMC is then in a position to ask Mr. Young in turn: "What did *you* have in mind as an alternative to deflationary fiscal and monetary policies?" And here the Young paper offers even less information than the Report.

Behind this matter of recurring ambiguity of language there lurks a serious question, to which the Young paper adverts at one point. On what kind of evidence are the conclusions of the Report, and hence its language, based? As Milton Friedman points out, the Report has been published before the study papers. There were well over one hundred such papers, far more than the Commission could possibly have considered, even in summary form. The vast majority are concerned with some aspect of money, finance, credit, or monetary policy. The number dealing with fiscal policy is much less, that dealing with international monetary affairs still less, and the number dealing with prices and price stability—or perhaps I should follow the Report in saying "reasonable price stability"—is exceedingly small. We do know, then, that space in the final Report is in no wise proportional to the volume of background study work; so that the rather surprising emphasis on such matters as fiscal policy cannot be explained on this account. And we are left in considerable doubt as to where the Commission derived its conclusion that reasonable price stability is fundamentally compatible with high employment and adequate growth. Mr. Young's statement on this compatibility-of-goals conclusion, that "the analysis supporting it is less extended than might be desired," is something of an understatement. But he himself is equally Sphinx-like in his statement that reasonable price stability will prove in fact to be essential to attaining other goals.

Mr. Friedman has more to say on this question of meaningful content. But I should like to approach his views on this matter via what is on the surface a quite different topic. He has argued that Commission members were, although unconsciously, pressing their own special interests. That is, I think, grossly unfair and seriously misleading.

Yet this matter of the special interests of CMC members is an important one. It is illuminating to learn that Allan Sproul (whose statement I mentioned earlier) initially accepted, at least tentatively, Commission membership—on the then-prevailing understanding that members were to be "chosen for their individual qualities, not as representatives of organizations or sections of the community." When that philosophy was subsequently abandoned in favor of "balanced representation," Sproul withdrew. There is accordingly a Sproul-Friedman agreement that the Commission ought to have been composed of men with special competence in the monetary field.

For good or bad, it was not so composed, and we have a Report which is different, and possibly worse, than it otherwise would have been. But I am not disposed to agree that in consequence the Report is either mischievous or meaningless. That is a question of what the Commission was set up to do.

The Report says on page 1 that it originated out of a "widespread concern" about the adequacy of the nation's monetary system. And so there was. But it was a vague concern, an uncertain fear about "too much debt" or "too much credit."

Whatever the concern, there was emphatically no demand for reorganization of the monetary and banking system. The demand instead was for reassurance about the existing system. To that demand, the Commission responded. If the task is reassurance, then a balanced representation is desirable. If there is vagueness in the Report (as there is), that is perhaps because reassurances tend by nature to be vague.

But the Report still is not accurately described as a kind of blending of special interests. Had special interests been paramount, there would have been no report at all. The Report carries a heavy cargo of footnotes of dissent, but it is nonetheless remarkable first that there should have been as much agreement as there was and second that there should have been agreement on so many topics.

By and large, the Commission was composed of commercial bankers and businessmen, the whole being lightly sprinkled with miscellaneous types, such as academics. Yet the result is not what might have been expected at all. As Smithies has pointed out,[2] there is not even a mention of the phrase "balanced budget." The demands for reduced governmental expenditure are confined to the tiniest footnotes of dissent. There is the statement that "a mixed private and public system best meets our national needs." By and large, the Report is a statement that the weight of public authority is needed, particularly through fiscal and monetary policies, in order to further such national goals as high employment and an adequate growth rate. That such a group—predominantly conservative, in the eyes of many academic people—should have said all these things is quite remarkable.

But this is the primrose path towards collectivism. It is, that is to say, from the viewpoint of an economist who requires an effort of logic to persuade himself that governmental intervention of any kind into the area of money is necessary at all, who believes that a decentralized economy is inherently stable if the co-ordination of human activity is left to a system of markets, who believes that human effort to ameliorate particular situations is as likely to do harm as good, and who believes further that discussions as to an "adequate" rate of growth are quite outside the sphere of proper policy discussions. It is clearly evident that Milton Friedman has sought to suppress his own monetary views in his paper. But I think that paper is itself better documentation for the case that special interests—intellectual interests—creep into all expressions of opinion than does the CMC Report. Lacking the background of such views, I am afraid his paper reduces to a series of carping objections which do not adequately document the conclusion that the Report is irresponsible and potentially mischievous.

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[2] Arthur Smithies, "The Commission on Money and Credit," *Q.J.E.*, Nov., 1961, pp. 544-68.

Let me choose as example that fatal first step down the primrose path: prohibition of interest on demand deposits. First steps, to be sure, are always small; but surely this one is quite microscopic. I do not presume to know what went through the minds of Commission members on this point. But they may possibly have felt that the effect of the prohibition on the level of bank profits was not entirely clear. They may also have felt that it is not enough to cite the maxim, "where the pricing system can, the pricing system should," and that the underlying principle of scarcity is less clearly evident with respect to currency or deposits than it would be with respect to commodities or productive inputs. Hence to use the pricing system for the allocation and acquisition of deposits would be something like the use of the pricing system for the acquisition of love: it would be technically possible, but would not necessarily lead to a more desirable allocation of scarce resources.

It is not fair to compare this Commission with the Aldrich Commission. As Samuelson has said, you can only discover a central banking system once. But any such statement is likely to broaden the basis for disagreement. Friedman will reply, I think, that the establishment of a central bank was not the proper remedy for the bank-panic situation which provoked the establishment of the Aldrich Commission. If I suggest—quite gratuitously—that the language of the present Commission's Report reflects a somewhat hesitant acceptance on the part of many members of ideas not in keeping with their traditional beliefs, Milton Friedman will say this is a more devastating comment on the Report than anything in his paper. The Report's voice is the voice of Pollyanna when, in his view, it should have been the voice of Cassandra.

There are ambiguities in the Report; there is plastering over. In part—in part only—this reflects the fact that it is a committee job. Anyone who has ever dealt with that kind of operation knows the particular difficulties to be encountered and the particular results to be expected. But it does not follow that there was no real consensus at all. A consensus is evident as much in what the Committee might have said, but did not, as in what it did say.

I suspect that Milton Friedman's accusation of ambiguity is not really directed at the Commission. It is directed at many of us present at this meeting. It might be better for us if the flame burned brightly and more clean within us—and it would certainly be easier. Instead, we are committed to the concept of a mixed economy, with all of its ambiguities, its uncertainties, its compromises. We hesitate to endorse a qualitative rate of growth, partly because there is enough of Milton Friedman in us to wonder if we ought properly to concern ourselves with acceleration of the growth rate, partly because we are not really sure, in our mixed society, if we can really make good on any commitment to any stated rate of growth. But we know also that we are committed to fiscal and monetary policies—including on occasion discretionary policies—and we consider such necessary to improve what might perhaps be called the natural performance of the economy. And because we are committed to such policies, we are to some extent in the rate-of-growth business whether we like it or not.

This somewhat exposed and ambiguous position leaves us, like the Commission, open to withering fire from one who is much less equivocal in his approach to this complex of problems. But I must frankly say that it will take rather more missionary work than is contained in the Friedman paper to call us fellow-travelers on the primrose path back to salvation and a true state of repentance for our sins. And I would remind its author that it is only because of these uncertainties that the topic remains one suitable for academic debate on an occasion such as this.

ROBERT LINDSAY: Professor Friedman finds the CMC Report innocuous because it dodges basic issues and dangerous because it gives one more authoritative endorsement to the conventional wisdom, which in his judgment is less wisdom than it is superstition. Messrs. Smith and Young seem to feel the Report is not especially exciting but certainly not disturbing, even though a better job might have been done.

One important issue that underlies these views and many other commentaries on the Report is the question of appropriate scope in such a study. During the life of the Commission, this scope was expanded considerably. The early proposals focused on the financial markets and institutions and on the policy instruments used to influence those markets. But somewhere along the line—perhaps in the effort to become "representative"—the Commission on Money and Credit became the commission on money, credit, fiscal policy, national goals, administrative procedure and many other matters, large and small. It ended up by setting its plow to the vast acreage of all economic policy. This is a lot of plowing, and it should be no surprise if much of it barely broke through the surface, if it produced clichés and question-begging. To be sure, Professor Friedman traces this result to something like special pleading. But this may be the same thing. If a man takes too little time for study, he may be forced to react with clichés or the folklore of his industry.

Yet even where the Commission obviously tried to push beyond clichés, its fields at times seem poorly plowed. Several examples have already been offered in the main papers today. Let me offer another. Look at the Commission's treatment of the area mentioned most often in the early proposals for such a study—the role of financial intermediaries. In Chapter II on monetary policy, the Commission examines the Gurley-Shaw doctrine and concludes that nonbank intermediaries do not need to be controlled because up to now they have not increased the cyclical swings in velocity. Their effect on velocity has been if anything countercyclical. Further along, in Chapter VI, the Commission comes back to the intermediaries, including the banks, and proposes that they be permitted much more flexibility in all their activities in the capital market. The intermediaries' possible contribution to velocity is now forgotten. Yet it seems quite conceivable that once the intermediaries have been freed from the regulatory bonds now restraining them, they might become more of a *pro*-cyclical influence on velocity. As they seek out new earning opportunities not open to them before, they can be expected to bid more eagerly for deposit funds to invest in these new ways. Any pro-cyclical element in earning opportunities becomes a pro-cyclical element in the bidding for funds by nonbank intermediaries.

Moreover, one must speculate about a future time, when nonbank intermediaries will invent new ways of poaching on commercial banks. Suppose, for example, that savings and loan associations were to extend something like checking privileges to their shareowners. They have little incentive to do so now, and the law does not allow them to, and the CMC apparently would not alter this legal distinction. But the day might come when savings and loan associations found the supply of mortgages to be leveling off and the supply of other assets (for example, consumer credit) to be rising. If so, they might then move toward an asset structure like that of commercial banks. They might then not mind a liability structure more like demand deposits, and we would see them expand the money orders and other gimmicks very much like checking accounts which some of them are already using. With this, they would blur the distinction between themselves and the banks on the liability side, which has already been blurred on the asset side. This would increase their ability to attract deposits and add still more to instability. This is not completely a fantasy. Something like it has occurred in South Africa. The point, however, is that the Commission has not probed the fundamental nature of these institutions to find out whether their past responses are likely to continue.

Still, if one were to conclude only that the CMC study was incomplete and innocuous, we would have suffered at worst a wasted opportunity. Professor Friedman insists, however, that the document is also dangerous—his paper says mischievous, but his tone says dangerous. Here again the underlying issue may be, in a slightly different sense, the appropriate scope of such a study. But here I think a difference of opinion would persist between Friedman and the Commission no matter how long the Commission had spent in covering the ground it chose to traverse. For Professor Friedman brings to mind the way old socialists used to speak of the New Deal. Why try to patch up the system, they said, when what we really need is a new system altogether. I am not insisting that Professor Friedman is necessarily wrong in this attitude. I am saying simply that he and the Commission are not talking about the same thing.

I do of course think he is wrong. He is disturbed that the Commission is recommending greater power to government in order to carry out policies that seem to him unproven in their efficacy and probably impossible to assess. His own program, however, entails a wide-scale reorganization of our present institutions as opposed to the rather mild amendments proposed by the CMC. His policy of a constant rate of increase in the money supply, for example, would probably require the adoption of 100 per cent money, or at least a major change from our present system of 12 or 15 per cent money. But if the present system is not completely proven, at least we know it has worked tolerably well, while Professor Friedman's system is completely untried. This is partly the issue of rules versus management. But since we start now with a system of management, those who advocate rules are the radicals, and those who would continue management are the conservatives. To be sure, Professor Friedman, in his doctrine of lags, finds positive menace in our present arrangements. But it seems to me that the replies and rejoinders to him on that subject have turned up many damaging flaws in his own arguments. I certainly hope these withering volleys will not cut down this promising subject in its prime, as some lags obviously do exist. And we need to know much more than we do about the channels through which the earliest and greatest responses will come—whether through changes in money supply, or bank credit, or liquidity positions or interest rates. But in the meantime, Professor Friedman's case has not, it seems to me, been strong enough to shift the burden of proof onto those who prefer policy by management to policy by rules.

Until it can be demonstrated, then, that our financial system is in need of complete overhaul, I would conclude that the Report is on the whole neither mischievous nor irresponsible. Innocuous perhaps it is, but its shortcomings stem from its having tried to cover too much ground in the time it allotted itself and not in having failed to recommend an entirely new financial system.

TAX PROBLEMS

INCOME, CONSUMPTION, AND PROPERTY AS BASES OF TAXATION

By RICHARD GOODE
Brookings Institution

A comparison of taxes on income, consumption, and property seems desirable because of recent criticisms of the income tax and interest in new forms of taxation on alternative bases. Dissatisfaction with the individual income tax arises partly from shortcomings of the American law and administration but also from the recognition that any income tax may have objectionable economic effects that were often overlooked in the past. Proposals for personal taxes on wealth and on consumption have been brought to the attention of professional readers by several reports, treatises, and journal articles appearing in recent years.[1] These taxes may offer the opportunity of taxing consumption and property holdings without sacrifice of progressivity and other refinements that have usually been associated with the income tax.

I shall consider mainly personal taxes on income, consumption, and wealth of individuals, with only brief reference to the corporation income tax, sales and excise taxes, and the general property tax. The personal taxes include, in addition to the individual income tax, the expenditure tax or spendings tax and the wealth tax or net worth tax. The wealth tax is imposed on the total value of an individual's taxable assets minus his indebtedness. The more familiar general property tax applies to the value of particular items or categories of property without aggregation for individual owners and without the deduction of debt.

Although administration and compliance are highly important in the evaluation of tax proposals, these considerations are omitted from the present paper. Even if it should be decided that the personal taxes on consumption and wealth are now impracticable, a comparison of these taxes with the income tax may help identify economic characteristics of different tax bases and indicate whether further study of the administrative problems is worth while.

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[1] Special mention should be made of Kaldor's work [4], [5], and [6], and the report of the Shoup Mission to Japan [10].

Influence on Saving

Much of the recent interest in the potentialities of consumption taxes can be traced to a belief that they favor saving and therefore growth. In examining this proposition, I shall avoid consideration of effects on saving due solely to differences in the distribution of taxes between high- and low-income groups, by assuming rate schedules for alternative taxes that would achieve approximately the same distribution of liabilities among broad income classes.

Given rates that will yield equal revenue, an expenditure tax allows a greater reward for saving than an income tax because under the expenditure tax the saver can postpone tax on the amount saved. His gain arises from the opportunity of earning interest on the postponed tax and from other advantages of holding wealth. If temporary taxes are compared or, more generally, if tax rates are expected to decline in the future, the expenditure tax is especially favorable to those who postpone consumption. A temporary income tax gives an inducement to postpone income but not necessarily to defer consumption; consumption may be maintained by dissaving.

Taxes on wealth reduce the possible return on savings more sharply than either consumption taxes or general income taxes of equal yield because property income is only a small part of all personal income. For example, in 1956 a 1 per cent tax on all personal wealth except consumer durables would have raised an amount equal to about one-fourth of all property income of the personal sector. The same amount of revenue could have been obtained from a general income tax of 3.7 per cent or a personal consumption tax of 4.6 per cent.[3]

Thriftiness, however, is not necessarily related in any simple way to the rate of return on financial assets and real capital. Many of the most influential theorists of the past half century have argued that it is uncertain whether an increase in the interest rate will stimulate or retard personal saving. So far as I know, there is no satisfactory statistical evidence on the question. In my opinion, little if any importance should be assigned to the incentive effects of differences in rates of return on savings that are obtainable under permanent taxes on income, consumption, and wealth. Short-run changes in saving ratios can perhaps be induced by temporary taxes on consumption inasmuch as these measures can be equivalent to very wide variations in interest rates and there have been occasions on which fluctuations in the ratios can plausibly be attributed to taxation. This characteristic may be important for stabilization policy, but it does not have much significance for growth.

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[3] Without allowance for tax exemptions or evasion. Based on estimates of net worth presented by Lampman [8, pp. 8-9], Goldsmith's estimates of the value of consumer durables [12, p. 151], and Department of Commerce estimates of personal income. In estimating property income I divided proprietor's income according to the average of (*a*) the asset basis and labor basis and (*b*) the economy-wide basis, as described by Kravis[7].

If we assume for the sake of discussion that the form of taxation has no influence on any individual's propensity to save out of disposable income, the relative use that is made of taxes on income, consumption, and wealth can nevertheless influence the national ratio of saving to income. The substitution of an expenditure tax for an income tax, for example, will reallocate taxes from high savers to low savers in each income class. On the plausible, but unsubstantiated, assumption that persons with high ratios of saving to income also have high marginal propensities to save, the national saving ratio will be increased because a larger fraction of disposable income will be left in the hands of high savers. The significance of the reallocation, however, can easily be exaggerated. Both high and low savers will be taxable under either tax. The difference between the income tax and the expenditure tax will be merely the difference between a total derived by weighting the components according to the amounts of income or of consumption of individual taxpayers. Inasmuch as consumption equals a large fraction of aggregate disposable personal income—more than nine-tenths in the United States in the postwar period—the proportions of revenue coming from potential saving will not differ greatly for taxes of wide coverage. This difference, nevertheless, can represent a considerable fraction of personal saving when taxes are high.

It is not clear whether the substitution of a wealth tax for an income tax or an expenditure tax (with rates set to distribute the total tax among income classes in the same proportions) would involve a reallocation of the tax load between persons with different saving propensities. The most widely accepted doctrine is that saving is inversely related to the ratio of wealth to income. Even if this is true at a given time for any one individual, it is not necessarily a reliable indicator of differences between individuals. Wealthy persons may have relatively high propensities to save because they have a taste for accumulation or at least come from families with that taste. As usual, the statistical evidence is incomplete and subject to different interpretations [3], [11, pages 184-86, 245-48].

Corporate saving is large and strategically important in the United States. The substitution of an expenditure tax for an individual income tax might affect total private saving far less than a substantial change in corporation income tax rates or a modification of the structure that would encourage or discourage the distribution of corporate profits.

If we were willing to replace the individual income tax with an expenditure tax, we might well be willing to eliminate the corporate tax on both retained profits and distributed profits. Preference for the expenditure tax would imply lack of concern about the postponement of taxes on saved income and the building up of economic power in the form of private wealth. If we were unconcerned about tax postponement on savings held directly by taxpayers, surely we would be indifferent to undistributed profits held by corporations on behalf of shareholders. On the other hand, the social and political considerations that lead one to support a wealth tax as a just and expedient measure—but not the economic arguments for the wealth tax—would suggest the continuation of the corporation income tax.

This brief review reveals no firm basis for supposing that the individual income tax, expenditure tax, and wealth tax differ greatly in their impact on personal saving. Admittedly, it does not refute the common belief that the expenditure tax is comparatively favorable to private saving.

A rise in the national saving propensity will contribute to growth only if accompanied by rising investment. The composition of investment, moreover, affects the growth rate and the social acceptability of any level of output. Consideration must be given to the influence of taxation on investment.

Influence on Investment

Whereas advocates of consumption taxes often imply that economic growth is largely a matter of the adequacy of saving, those who favor a wealth tax are usually concerned about the inducement to invest. The latter attach great importance to the fact that hoarding does not free one from a wealth tax but does relieve one of income tax or expenditure tax. Liability for wealth tax is not immediately increased by investing cash balances, converting conservative securities into shares in risky enterprises, or borrowing in order to undertake a business venture. Income tax liability may be increased by these actions.

The fact that the wealth tax does not differentiate between assets according to the current rate of return is not always favorable to investment. The wealth tax is less conducive to investment in growth stocks and similar items than is a tax on realized income or on consumption expenditure. These assets have a low ratio of current earnings to value, but earnings are expected to increase. Differences in timing of liability under the three taxes are highly significant. A wealth tax applies immediately and increases if the market value rises as the additional earnings become more probable and closer in time. The income tax applies only when a gain is realized; the expenditure tax is paid only when the return is consumed. If the income tax is lighter on capital gains than on ordinary income, the attractiveness of the growth-stock type of investment is further enhanced.

If we abstract from differences in timing, a wealth tax appears to be less discouraging to investment than a tax on investment income because the wealth tax encroaches less on the reward for surrender of liquidity and assumption of risk and uncertainty and for selecting and supervising the investment. An income tax with perfect loss offsets would reduce equally the amount at risk and the net return and in this respect would be neutral. But loss offsets are not perfect if operating loss carryovers are of limited duration, capital losses cannot be fully deducted against taxable income, and tax rates are graduated. A wealth tax automatically allows capital losses to be offset against taxable wealth as long as the investor's net worth remains positive; however, loss offsets are imperfect if no provision is made for a negative tax on negative net worth and if tax rates are graduated. My judgment is that loss offsets, especially for financial investment, are likely to be more effective under a wealth tax than they are under the present U.S. income tax law or any other income tax provisions that will be considered feasible and otherwise acceptable.

An expenditure tax is also more favorable to investment than an income tax that lacks perfect loss offsets. The expenditure tax allows the investor to set aside whatever premium he thinks appropriate to cover his risk and to recoup his investment as quickly as market conditions permit.[3] In short, the investor's own behavior rather than formal accounting requirements and legal rules defines the return that is subject to taxation.

To summarize, an expenditure tax seems likely to be less damaging to investment incentives than an income tax unless the latter includes extraordinarily liberal provisions for loss offsets, flexible amortization, and averaging. A wealth tax may be superior in this respect to a tax on investment income or a tax on consumption expenditures of high-income groups. It is not clear, however, that substitution of a wealth tax for a general income tax or an expenditure tax of broad coverage would stimulate investment. Inasmuch as most of the yield of the general income tax or broadly based expenditure tax would have been contributed by recipients of earned income, the amount of tax paid by investors as a class would increase. The heavier weight of taxation on investors might counterbalance any incentive advantages of the wealth tax form as a means of allocating taxes among property owners.

A full analysis of the influence of taxation on investment must take account of investment in human beings. The income tax now discriminates against this kind of capital formation because it does not allow the costs of education and other outlays that contribute to future earning capacity to be amortized against taxable income. This discrimination would probably continue under the expenditure tax inasmuch as most expenditure tax proposals do not treat the formation of human capital as saving. Wealth taxes or property taxes, on the other hand, discriminate in favor of human capital inasmuch as the capital value of expected earned income is not considered property. The encouragement of additions to the stock of human capital appears to be highly desirable because this kind of investment may not be carried as far as would be socially desirable, owing to imperfections of institutional arrangements for financing it and other peculiarities. It is not evident, however, that investment in human beings is highly responsive to the rate of return. Although the economic element is present in most decisions concerning higher education and other activities that increase earning power, noneconomic considerations are more important here than in respect of business investment. Hence the influence of different tax treatments is especially uncertain.

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[3] Although Brown is right, in my opinion, in criticizing Kaldor's treatment of risk [2], the latter's judgment that an expenditure tax is more favorable to risk bearing than an income tax seems correct when the comparison is between realistic and hence imperfect versions of the two taxes.

Influence on Work

Consumption taxes are often said to be more favorable to work incentives than are income taxes. Most of those who make this statement seem to have in mind a comparison between a progressive income tax and indirect taxes on consumption. Differences between these taxes, however, may be due more to their rate structures than their bases. I shall comment on the indirect taxes in a later section, but first I wish to refer to an income tax and an expenditure tax of equal yield and substantially similar progressivity, both of which are expected to be permanent.

Immediate or future consumption is presumably the principal reward that motivates work, insofar as economic considerations are controlling. The expenditure tax and the income tax will have much the same impact on this reward. The possibility of holding wealth and of leaving an estate no doubt induces some highly paid work, and these objectives can be more easily attained under an expenditure tax [4, pages 135-36]. But the recognition of this fact merely poses in a new form the old question of the shape of the supply curve of labor. We do not know whether a tax that allows a higher rate of compensation—in the form of wealth accumulation or consumption—calls forth more or less work than a tax that allows a lower rate of earnings.

Indirect and Impersonal Taxes on Consumption and Property

Direct and indirect taxes on consumption should have the same economic effects provided their coverage is similar, rates are equivalent, and taxpayers do not have a money illusion or a "fiscal illusion."[4] The money illusion, although perhaps important in the short run, is probably not significant in the long run. It does not seem feasible, however, to satisfy the conditions of similar coverage and rate structures for direct and indirect taxes on consumption. Indirect taxes typically do not apply to expenditures for rent, wages of domestic servants, and many other services or to expenditures abroad. Even the most elaborate system of selective excises involving differentiation in tax rates according to price classification as well as commodity classification would not be likely to achieve any considerable degree of progressivity with respect to income of consumers. An impersonal tax on property cannot be made to conform to any nicely progressive scheme, although it may impose heavier taxation on high-income persons as a broad group than on low-income and middle-income people.

Personal taxes on income, consumption, and wealth need not be progressive but are likely to be so, given prevailing political sentiments. Partial substitution of indirect taxes on consumption for either the income tax or an expenditure tax, therefore, would reduce over-all progressivity. There are reasons for believing that, other things equal, progressivity discourages work and investment. Hence a mixed system may be consistent with a higher level of output than a system relying mainly on direct taxes. It is uncertain whether the difference is large or small.

The difference between the impersonal, but direct, tax on property and the wealth tax turns more on coverage and the treatment of debt than on progressivity. The property tax appears to be more repressive of investment than a wealth tax.

Conclusion

My analysis tends to depreciate economic differences between income, consumption, and property as tax bases. Partly this reflects the belief that on close examination certain apparent differences disappear or are overwhelmed by other characteristics. To a greater extent, it is a confession of ignorance—a judgment that we cannot now confidently evaluate the significance for behavior of certain discrepancies between the three tax bases. At several points, my appraisal may be considerably influenced by the simplifying assumption that the alternative taxes would be allocated among income groups in about the same proportions. This assumption, although convenient, is unrealistic. The taxes almost certainly would be distributed differently.

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[4] Brown argues [1], and Musgrave agrees [9, pp. 449-50], that direct and indirect taxes may affect consumption differently even in the absence of a money illusion. I am unwilling to accept this conclusion because I question the correctness of the deflator that Brown uses to convert money income into real income and am skeptical of the economic significance of the role that he assigns to "autonomous consumption"; i.e., the constant term in the linear consumption function.

In addition to broad economic effects, other factors are important in the choice among tax bases. These considerations include appreciation of the fairness of different taxes, attitudes toward progressivity, and feasibility of administration and compliance. If economic differences between the tax bases are judged small or uncertain, the other considerations may be decisive.

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TAX INCENTIVES FOR INVESTMENT*

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I. *Introduction*

It would be a pleasure to report to you that all the obscurities about the investment process and the impact of fiscal and monetary policy on it have been cleared up, that we now have fiscal and monetary devices with predictable effects on investment, and that any desired degree of capital formation can now be achieved. As I say, it would be a pleasure, but it would hardly square with the facts.

Despite this lack of precision about the determinants of capital formation, many governments have proceeded briskly to experiment with fiscal devices designed to stimulate investment. Especially following World War II, a movement toward manipulating depreciation or tax reductions to induce variations in capital formation is evident. In this country the Eisenhower Administration modified depreciation charges in 1954, and the Kennedy Administration recommended this year a tax credit to stimulate investment in plant and equipment and is now moving in the direction of a further liberalizing of depreciation.

Partly this movement has come as an outgrowth of experience with the wartime use of accelerated depreciation to encourage plant expansion for the production of war output, but this technique is at least as old as World War I. Partly it has come from the emphasis on economic growth in all countries and the general, although perhaps premature, disenchantment with monetary policy as a means of stimulating it. And partly it has come from the sharp rise in tax rates on investment income with the consequently greater leverage such fiscal devices potentially could have.

The greater interest in and use of these techniques has been aimed primarily, although not solely, at long-run goals rather than combating short-run economic swings, and my focus will be primarily on this aspect. Devices of this type can be used successfully to deepen capital when substitution is possible between capital and labor—the ordinary view of the long-run prospect. Adding capital to a given labor force can then increase the production possibilities open to society at any point in time. Whether or not it is desirable for future generations to

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* I want particularly to acknowledge helpful discussions and analyses of William L. White. They were over and above the call of duty of a graduate student to keep his teacher on a reasonably straight course.

have a larger menu is not the question here. That depends upon the value judgments of society. What has been at issue in the discussions of investment stimulation is whether or not greater capital formation can be achieved at all. Clearly it can be unless all production functions have fixed proportions between capital and labor. In such an event, the added profitability of investment could not add permanently to more capital formation. If there were more capital temporarily induced in the short run, it would be redundant. Whether or not such substitution is possible is, of course, a question of fact. But I shall proceed on the usual assumption that some substitution is possible over long-run periods.

My interest, then, is to consider some of the differing consequences of alternative policies applied over fairly long periods.

II. *Effects on Particular Investment Decisions*

Of first interest is the effect of fiscal devices on particular investment decisions. Alternative fiscal devices should be compared with each other and also with monetary changes. We are here concerned only with immediate effects on the investment decision, not on the full working out of the new general equilibrium achieved under alternative policies. Consider the common investment model in which the business manager compares the present value of a stream of net receipts expected from a particular investment with the cost of acquiring it. It is assumed initially that the firm has access to the capital market and that the stream of revenues is uncertain. The determination of present value requires some discount both for uncertainty and for the cost of capital to the firm. If the present value so determined exceeds cost, profit maximization requires that the asset be acquired.

In the process of determining present value, taxes must also be deducted. Since our focus is on depreciation, it is, perhaps, easiest to think of the government as applying the tax to the stream of net receipts prior to the depreciation deduction and then making a series of rebates for depreciation, the time shape of which would depend on the depreciation formula—straight-line, declining-balance, or what have you. Notice that the present value of the depreciation deduction depends, among other things, on the certainty with which it can be taken in the future against otherwise taxable income. Expected future taxable income is not necessarily dependent on the net revenues from the particular investment being considered, but on the firm's total activity. A large, well-diversified firm could count with a fair degree of certainty on getting a tax benefit from depreciation, regardless of the particular fortunes of the asset on which depreciation is to be taken. The small firm, for which the particular investment may bulk large, could find itself faced with some considerable uncertainty about the value of prospective depreciation deductions[1].

I note parenthetically that the combination of these factors, even when the depreciation deduction is expected with certainty, can drastically alter the durability of the asset structure. If one solves for the cost of an asset at which it would just pay the firm to invest, the combination of sufficient uncertainty and the spreading into the future of depreciation can actually lower the price a firm would pay for longer-lived assets, despite the fact that they would yield more aggregate (undiscounted) revenues.

How do fiscal and monetary changes alter the present worth and, hence, the investment decision? A cut in interest rates will raise the present value of the stream of net receipts less taxes and will also raise the present value of the tax savings from depreciation. The relative increase in present value will be less the greater the discount for uncertainty (since the interest discount then has essentially a smaller stream of revenues to grip after uncertainty has already taken its toll) and will be greater the longer the length of life of the asset.

This increase in present value can be achieved in other ways as well. A tax credit at some percentage of the cost of the investment can provide it directly. To have the same initial consequences on all assets as a cut in interest rates, the per cent of cost allowed as a tax credit would have to depend on the length of life of the asset and on the uncertainty of the decision, if the tax credit were to be granted every year. If it were to be available for only one year, such considerations would not arise. Since any investment undertaken in a particular year would gain the credit, there would be no substitution effect operating on asset durability. It would simply represent a lump-sum tax reduction for investment. But if the credit were a continuing one, a stream of short-lived investments would earn the credit oftener over a given period of time than would a stream of long-lived investments, and hence a shift toward shorter-lived assets would be encouraged.

To give some idea of the order of magnitude involved: assuming no discount for uncertainty, straight-line depreciation, level annual expected net receipts, and a 50 per cent tax rate, a cut in interest rates from 8 to 6 per cent would require a tax credit of 11 per cent for a fifteen-year debt-financed asset (19 per cent for a thirty-year asset). A 25 per cent discount for uncertainty would reduce the equivalent credit to 8 per cent for the fifteen-year asset (9 per cent for the thirty-year).

The manipulation of depreciation can also vary present values. There are an infinite number of ways of altering the time-shape of the depreciation deduction: the deduction can be increased in the first year leaving a fractional amount of cost to be treated in the standard way, the stream of depreciation deductions can be truncated, or it can be modified throughout by some more or less standard technique. For purposes of simplicity in exposition here, I will consider only such alteration in depreciation as a larger first-year or initial allowance, with the balance of the cost spread over the asset's life. The gain in present worth in this case comes from a more prompt deduction of depreciation and, if uncertainty regarding its deductibility in the future is present, from a more certain deduction. Again to give orders of magnitude under the same assumptions as before, an initial allowance of nearly 60 per cent of the cost of a fifteen-year debt-financed asset would be equivalent to the interest rate cut under conditions of certainty (over 60 per cent for thirty-year assets); nearly 40 per cent when the uncertainty discount is 25 per cent (about 30 per cent for the thirty-year asset). If the depreciation deduction were substantially uncertain, these amounts would be sharply reduced[2].

This type of alteration in the depreciation pattern reverses the tax credit's pressure on asset durability. Since this form of accelerated depreciation amounts to an interest-free loan to the firm that is repayable over the life of the asset, longer-lived assets are stimulated more than shorter-lived. To maintain the same present value as the interest rate cut, the tax credit should rise with durability, while the initial allowance should fall for sufficiently high discount rates.[1]

Finally, one can cut the rate of income tax to equalize the effect of the interest rate cut. Rate reductions act somewhat differently from cuts in the interest rate. While a rate reduction increases the value of discounted net receipts, it reduces the present value of the depreciation deduction. Interest rate reduction increases them both. Moreover, if the investment is debt-financed, the reduction in tax rate has virtually no immediate effect.

So much for some of the alternatives when the capital market is available. At the other extreme—that of capital rationing—the various techniques take on a different significance. Under these conditions, interest rate changes will have no effect upon present values, unless the firm has pushed investment to the point where the internal rate of discount is equal to the interest rate. Accelerated depreciation, investment credits, and tax reduction would then affect the internal rate of discount. The ranking of these policies would then change. The maximum stimulation to current investment would be given by the fiscal device that provided the firm with the most immediate cash.

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[1] This is not strictly true for all possible values of the variables. Under conditions of certainty, the initial allowance must rise slightly because of the more powerful leverage of interest rate cuts on longer-lived assets under such conditions. As the uncertainty discount rises, however, this pattern is reversed.

Aggregate tax reduction would then be the important test, of which more in a moment.

III. *Other Tests of Alternative Devices*

All of these techniques can be thought of as simply transfer devices, and in a sense a choice between them must be arbitrary. In a completely rational world, any device chosen to achieve a given investment effect can be duplicated by a combination of some other device plus a system of taxes and subsidies.

The more realistic problem, it seems to me, does not give us this amount of freedom. Judging by the last decade, some resources may continue to lie idle in the future and could be absorbed through tax reduction or easier money. Yet the amount of tax reduction will be severely limited by budgetary considerations. Nor is it likely that some tax cuts can be made and added taxes imposed elsewhere in order to achieve certain desired effects.

Under these circumstances it would be desirable, other things equal, to adopt the device with maximum investment stimulus per dollar of revenue loss if the wish is to have higher rates of investment at any particular level of aggregate demand.

Most of these fiscal devices have income effects, which can raise disposable income and consumption, and substitution effects, which can raise the investment component of total demand. Given a limited amount of fiscal adjustment possible, it would seem best, then, to minimize income effects and maximize substitution effects if all firms had equal access to the capital markets. If capital rationing is the rule, the case is less clear. Income effects of tax reduction may then raise capital formation in much the same way as substitution effects would in the previous case. Since I cannot accept the extreme view that there are no contacts between investment decisions and the capital market, or that the marginal propensity to invest tax reduction is the same, regardless of the form of the reduction, I place a good deal of weight on the desirability of getting maximum substitution effects with any particular fiscal device, always on the assumption, of course, that a shift in resources toward more capital formation is desirable. But this rule may be qualified, as below, when more rational budget policies are followed.

There are other tests of these policies that are interesting and important and that deserve mention. Effects of any policy on the distribution of income are always relevant. They raise extraordinarily complex problems as the policy changes are traced out through a general equilibrium system and will not be considered further here. My hunch is that interest rate adjustments, assuming them to have equal effectiveness in the long run on investment decisions, would involve less redistribution after tax toward investment income than would fiscal devices, but this is only a guess at this stage.

It may be desirable to adopt techniques which are as neutral as possible in their effects on the durability of capital and which offset the adverse effects of uncertainty. The proper standard for neutrality is a difficult one, however, since it would differ as between an existing situation and the situation that would be found by an equivalent interest rate reduction.

There are also side effects from some devices that may not be present in others. For example, some methods may enter into managerial decisions other than investment decisions in a way which may be thought undesirable. Pricing or dividend decisions are affected more under some devices than under others, especially when depreciation is manipulated. Since booked depreciation tends to follow tax depreciation, and since overhead costs may creep slowly into the decision-making process, some of the advantages of a higher rate of capital formation may be lost.

The countercyclical implications of investment stimulation may also enter into the final decision. Almost any movement toward increasing the proportion of output in investment goods will place a somewhat heavier weight on countercyclical stabilization policy. This added weight for feasible devices seems relatively modest, however, and should be readily handled.

IV. *Pattern of Revenue Losses from Investment Devices*

To pick up the thread, then, of the consequences of these alternative devices on the budget position or their efficiency in stimulating investment per dollar of revenue loss, interest rate adjustments would appear to get the highest marks. They are largely extrabudgetary in their consequences, although lower interest rates would decrease transfer payments for interest on the public debt and lower tax collections would result if aggregate interest income fell as a result of easing money. Unfortunately, in a world in which capital can move freely internationally, interest rate policy is subject to restraint by the policies of other governments, and sharp changes might well have adverse balance-of-payments effects. Moreover, unless all firms have equal access to capital markets, they are a more discriminatory device than generally available forms of tax reduction.

The application of accelerated depreciation, tax credits, or rate reductions to existing as well as new assets would be an enormously costly way to achieve a given substitution effect. Ideally, it would be desirable to limit the tax stimulus to marginal investment decisions. Application of fiscal devices to old as well as new investment would result in huge lump-sum transfer payments to firms based on the amount of assets held at the time the tax reduction was initiated. Even minor retroactive acceleration of depreciation can involve impressively large transfer payments to firms. Moreover, the segregation of profits on new investment from that on existing capital is impossible, making the income effects of income tax reductions relatively large.

That leaves us with accelerated depreciation or tax credits on new investment as the major alternatives, judged solely from this viewpoint of achieving maximum stimulus with respect to given revenue losses. The initial allowance differs from the tax credit in that it is a predated tax reduction that will be recaptured for a continuing concern only when its net depreciable assets become zero; that is, when liquidated. When rates of investment are stationary, the initial allowance creates a bulge in aggregate depreciation which ultimately settles down to the level it would have been had no acceleration taken place. But in a growing economy, accelerated depreciation will always run ahead of this standard amount.

The tax credit provides tax reduction which is less in the early years of its permanent enactment, but which can be more in later years than accelerated depreciation. It is an interesting question how these two devices compare from year to year. Naturally, this will depend on a number of variables: the durability of the investment, the rate of discount, the degree of uncertainty, the rate of growth of investment, and the tax rate. Some bench marks may again be illuminating.

Consider the case in which all assets last fifteen years and in which firms are certain about their depreciation deductions. A ruling interest rate of 8 per cent would find these two devices of equal incentive effect when the initial allowance was about 40 per cent and the tax credit about 8 per cent, and this relationship would not change particularly under conditions of uncertainty about the future revenue streams. The annual revenue loss under the 40 per cent initial allowance and 50 per cent tax would steady down to almost 3 per cent of current investment when the growth rate of investment is 2 per cent, 5 per cent for a 4 per cent growth rate, nearly 7 for a 6 per cent rate, over 8 per cent for an 8 per cent rate, and nearly 10 per cent for a 10 per cent growth rate. Since the investment credit is 8 per cent per year, growth rates of about 7½ per cent or less would permit annual losses from the initial allowance to catch up with those from the investment credit. For growth rates of 2, 4, and 6 per cent, the annual losses would be equal under the two methods in ten, eleven, and thirteen years, respectively. Even a zero growth rate would require nine years[3].

Aggregating the revenue losses under the two techniques indicates that they equate at nineteen years when there is no growth in investment, and at twenty-one, twenty-five, and thirty-three years for growth rates of 2, 4, and 6 per cent, respectively[4]. As indicated above, at rates over 7½ per cent the revenue losses under the initial allowance always exceed those under the investment credit. If the losses were discounted to the present, the lower cost of the investment credit would be made even clearer.

This raises a puzzling question. How can two methods of investment subsidy that involve the same present worth on a particular investment differ so much in cost in present worth terms to the government? Indeed, couldn't one go even farther? In the face of uncertainty, shouldn't it always be better to advance funds to firms, as an initial allowance does, in return for future taxes on which the firm puts a low value but which the government can expect with considerably greater certainty given the pooling of risks from all investments that the taxation of business profits represents? And shouldn't it be more economical to the government than making a payment, such as the investment credit, with no hope for recapture, and which is based on the firm's, not the government's, discount for uncertainty?

The problem arises, I believe, because the incentive effects of these allowances are equated with respect to particular investments which, in a real sense, are ultimately liquidated. But in a continuing and growing economy bigger and bigger commitments must be made every year; so the account is never balanced. Thus, the investment credit could be a more costly device for the reasons raised above. But if the government must continue to grant large allowances on a growing investment, it cannot get out of the lending business. There are rates of growth at which its commitments on current investment increase so much faster for the initial allowance that they wipe out these costs. So that even a highly rational budget decision must be adverse to the initial allowance at some growth rates. And given the irrational views that are held on budget policy, the lengthy period over which budget losses are greater under the initial allowance almost guarantees it would be whittled down.

V. *Devices Aimed More Directly at Stimulating Growth*

While accelerated depreciation may have substantial revenue disadvantages, it has one interesting characteristic. Ultimately, after the large transitional revenue losses have been sustained, particular firms will receive no extra reduction in income unless their current investment exceeds their normal depreciation. The investment credit, on the other hand, draws no distinction between growing or stable firms, except to the extent that a larger tax reduction arises under conditions of growth than under stable conditions. If outlays were to fall below some kind of past average, a tax credit on these outlays would nevertheless be given. Modification of the tax credit to apply it to the excess of investment outlays over depreciation, as proposed by the President this year, can, however, limit tax reduction to a growth situation and can also result in a substantial increase in the size of the tax credit allowed by narrowing the base for the credit.

If one searches for devices that increase substitution effects and minimize income effects, a higher marginal tax credit applied in some degree more specifically to extra investment has a good deal to be said for it. We have no brooding omniscient who can select marginal investments for us. In matters of economic policy, it is usually impossible to pinpoint a stimulus. Any rule will bring in some investment which would otherwise have been made and leave out some that is genuinely marginal. But such a proposal as the President's would have shifted the stimulus probably in the direction of more growth.

An appraisal of the effects of such a credit on investment, in contrast with one available on all investment, certainly does not warrant dogmatism. There is, first, a question as to how such a credit would enter into the investment decision. In one sense, it is like accelerated depreciation in that a tax credit taken currently may merely involve borrowing from the future. That is to say, extra investment induced now would raise the amount of future depreciation and reduce the future credit that could otherwise be earned. I am doubtful if firms would take this into account in this way, but my view is mainly a matter of judgment.

In order for current investment to be charged with future reductions in tax credits, these added future taxes must be expected with some degree of certainty in order for a present valuation to be placed on them. On what do these future tax credits depend? On the excess of future outlays over future depreciation multiplied by the rate of tax credit then in force. If the investment planning period were sufficiently long—say ten years or more—the computation of future credits could be made, given reasonable judgment about the rate at which future tax credits would be granted. I think that these twin uncertainties—those regarding future investment and those regarding the future tax credit—would reduce this future offset almost to zero in the firm's reckoning, particularly at the present time. The tax credit is an untried device. There has been considerable resistance to it. Congress has wanted to place a definite time limit on it, although the Treasury wants it thought of as a permanent device. I would, therefore, expect its incentive effects to be measured more closely by its current gross rate.

Even aside from this consideration, there is the added difficulty of appraising the implications of such a device selectively on the investment decisions of firms. Some firms' depreciation is above current investment; some are found below the line. Some firms would be favored by the selective method; others by the general investment credit. If all firms respond similarly to the investment stimulus, presumably more investment would be gained marginally by the higher selective credit. Yet it is theoretically possible, although I would think unlikely, that those below the depreciation line would respond more sensitively to an investment stimulus than those above it. And in such an event, more investment would be associated with the unselective devices. These are puzzling questions that would affect one's choice between alternative devices, but I cannot pursue them further here.

The experiment with and growth of investment-stimulating devices is a fascinating chapter in fiscal policy deserving detailed study. If economists are to be useful to those designing policy, it behooves us to press on with our study of investment decisions to give them breadth and depth comparable to our knowledge of consumer behavior.

APPENDIX

[1] $$P.V. = \int_0^n R(1-t)e^{-(r+u)t}dt + t\frac{C}{n}\int_0^n e^{-rt}dt,$$

where n = length of life of asset, R = expected net receipts, t = tax rate, r = discount for interest, u = discount for uncertainty, and C = cost of acquiring asset. Depreciation is straight line.

[2] Equal effects on changes in present value can be compared as follows, assuming a 50 per cent tax rate.

$$\Delta P.V. = cC = iCt - t\frac{iC}{n}\int_0^n e^{-rt}dt,$$

where c = the tax credit on the cost of the asset, and i = the initial allowance, used to reduce the basis of the asset for future depreciation.

[3] Annual revenue losses of a 40 per cent initial allowance or an 8 per cent tax credit can be compared as follows, assuming a 50 per cent tax rate, straight-line depreciation on assets all with a life of 15 years, and varying growth rates such that investment $(I_t) = e^{gt}$.

Annual revenue loss in period t during first 15 years.

1. Initial allowance $= .2e^{gt} - .2\,\dfrac{1}{n}\displaystyle\int_0^t e^{gT}dT$

$$= .2e^{gt} - \frac{.2}{15}\,\frac{e^{gt} - 1}{g}$$

2. Investment credit $= .08e^{gt}$

They equate when

$$e^{gt} = \frac{.2}{.2 - .12(15g)}$$

Annual revenue loss in period t after first 15 years.

1. Initial allowance $= .2e^{gt} - .2\,\dfrac{1}{n}\displaystyle\int_{t-n}^t e^{gT}dT$

$$= .2e^{gt} - \frac{.2}{15}\,\frac{e^{gt}(1 - e^{-15g})}{g}$$

2. Investment credit $= .08e^{gt}$

Expressed as a per cent of current investment:

Initial allowance $= .2 - \dfrac{.2}{15}\,\dfrac{(1 - e^{-15g})}{g}$

Investment credit $= .08$

[4] Aggregate revenue losses from year 0 to year t are:

1. Initial allowance

Years 0–15: $\displaystyle\int_0^{15} .2e^{gT}dT - \int_0^{15} \frac{.2}{15}\,\frac{e^{gT} - 1}{g}\,dT$

Years 15 to t: $\displaystyle\int_{15}^{t} .2e^{gT}dT - \int_{15}^{t} \frac{.2}{15}\,\frac{e^{gT}(1 - e^{-15g})}{g}\,dT$

Years 0 to t: $\dfrac{3ge^{gt} - .2e^{gt}(1 - e^{-15g})}{15g^2}$

2. Investment credit

Years 0 to t: $= \displaystyle\int_0^t .08e^{gT}dT = .08\,\frac{e^{gT} - 1}{g}$

These expressions equate when:

$$e^{gt} = \frac{1.2g}{.2(1 - e^{-15g}) - 1.8g}$$

THE SENSITIVITY OF THE YIELD OF PERSONAL INCOME TAX IN THE UNITED KINGDOM*

By ALAN R. PREST
University of Cambridge

Empirical estimates of marginal tax rates have frequently been made in the U.S.A. but much less commonly in the U.K. The need for such information would seem to be just as great and so it may be the complications of British tax arrangements (e.g., income taxation covering companies as well as persons), the form in which the British data are presented or the relatively greater frequency of tax rate changes in that country which have deterred investigators in the past. In this paper we present the first results of some investigations into the marginal rate of personal income tax, including surtax.[1] It is hoped to follow up these results with those for other taxes at a later date; but personal income tax is a sufficiently important element in the U.K. tax structure for the conclusions to stand on their own.

The method is to make estimates of marginal tax rates on the basis of time series and to check these by their predictive power. Subsequently cross-section data are analyzed and the possibilities of using U.S. methods with U.K. data or of using quarterly data are explored. Some general comments on the results follow.

The first task in the time series approach was to obtain a series for the period 1948-49–1959-60 which was free of the influence of changes in rates of tax, allowances, etc. This involved a number of intricate steps but the basic idea was to make use of estimates in the annual *Financial Statement* of (1) the changes in tax yield if rates remained unchanged and (2) the changes in tax yield likely to result from the Chancellor of the Exchequer's proposals for altering rates, allowances, etc. Building on these foundations and making due allowances for all such matters as differences between estimated and actual revenue changes, the separation of personal from corporate taxes, etc., it was possible to devise two series of standardized tax yields for the period, one based on the 1948-49 rate and allowance structure and the other on that for 1959-60.

Various regressions of tax on income (both lagged and unlagged) were then computed so as to make estimates of marginal tax rates on the two rate bases, the results being a figure of about .30 for 1948-49 rates and about .20 for 1959-60 rates. The standard errors of some of the results were rather high and at first sight it seemed that the forward predictive power of the estimates was not very good, at least in comparison with those obtainable from the naïve hypothesis that the percentage change in tax yield between 1959-60 and 1960-61 would be the same as that between 1958-59 and 1959-60. But prediction from the regressions was found to be improved considerably if cognizance was taken of the fact that there was an excess of actual over estimated tax revenue in each of the last three years of the period investigated.

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* This is a summary of the main points in a paper to be published in the *Econ. J.*

[1] Technically a different tax from income tax, but arranged so that the two sets of tax rates mesh together to form a uniform progression.

Alternative time series regressions of standardized tax on income were calculated, first, by omitting the time trend factor and, second, by disaggregation of tax and income into two components—one being that element of personal tax which is paid in respect of current year income (e.g., wages and salaries), the other being tax paid in arrears (e.g., noncorporate profits). Although plausible results were obtained in both cases (e.g., a marginal rate of .16 for wages, etc., and .18 for profits, etc.) they were not very acceptable statistically. And on the ultimate test of prediction they were less satisfactory than the original results.

The results based on 1948-49 rates were tested by computing the tax payable in 1947-48. When allowance was made for tax rate changes between 1947-48 and 1948-49, the computed figure was found to be in close agreement with the actual.

In the cross-section results, use was made of *Inland Revenue* and *National Income Blue Book* data to fit a relationship between tax per family unit and income per family unit from which it was deduced that the elasticity of tax yield with respect to income was 2.0 in 1959. Various alternative ways of computing a community marginal tax rate on this basis suggested a 1959 figure lying between .17 and .23. There are some grounds for arguing that these cross-section results may be biased downwards on account of time lags in some tax collection. The agreement between cross-section and time series results for the 1948-49 rate basis was less satisfactory.

Application of the methods commonly used by U.S. writers[2] did not seem to be practicable in the U.K. mainly due to the much greater

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[2] E.g., the calculation of

$$\frac{\Delta \text{ Taxable Income}}{\Delta \text{ Adjusted Gross Income}}$$

and of

$$\frac{\Delta \text{ Tax}}{\Delta \text{ Taxable Income}}$$

frequency of changes in rates and allowances—quite apart from definitional differences. Finally, quarterly data of personal taxation and income were explored but did not yield sufficiently satisfactory results to use as a check on the others.

The plausibility of a marginal tax rate in the region of .20 in 1959-60 was examined next. There are reasons for believing that the contribution of the surtax component of personal income taxation to the size of the marginal rate is small and on general grounds our statistical findings seemed reasonable. The difference between the estimates of the two marginal rates (i.e., that based on the 1948-49 rate and allowance structure and that based on 1959-60) fits in with what we know about average tax rates in each of the two years and with rate and allowance changes over the period. Finally, the negative time trends found in the time series regressions seem likely to be due to the decreasing inequality of income distribution over the period, the increase in the number of children for whom tax allowances could be claimed, the diminution in the number of unused children's allowances and the increase in the ratio of married women's earnings (taxed more lightly than other forms of earned income) to total income. All these results are of an experimental nature and further work is needed to refine them.

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and hence the derivation of

$$\frac{\Delta \text{ Tax}}{\Delta \text{ Adjusted Gross Income}}.$$

Cf. J. A. Pechman, "Yield of the Individual Income Tax during a Recession," *Policies to Combat Depression,* NBER (Princeton Univ. Press, 1956); L. J. Cohen, "An Empirical Measurement of the Built-in Flexibility of the Individual Income Tax," *A.E.A. Papers and Proceedings,* May, 1959, and "A More Recent Measurement of the Built-in Flexibility of the Individual Income Tax," *Nat. Tax J.,* 1960.

DISCUSSION

George F. Break: Dr. Goode has presented a cogent and concise analysis of the proposition that permanent, equal-yield taxes on income, consumption, or net wealth are unlikely to differ greatly among themselves in their effects on incentives to invest, consume, or work. Unfortunately for lovers of controversy, I find myself in general agreement with this conclusion. Indeed, my only reservations about the arguments presented serve only to strengthen Goode's case.

As far as a tax on net worth is concerned, I would advocate the inclusion in its base of the capital values of human beings. These values could be computed from tables provided by the tax administration and taking into account such factors as the taxpayer's average earnings in recent years, his remaining years of work-expectancy, an appropriate interest rate, and perhaps also the average trend of lifetime money earnings in his occupation. Admittedly, such calculations would be arbitrary for particular taxpayers, but a tax that excluded them, and thereby assumed personal earning power to be equally distributed among taxpayers, would be much more arbitrary and inequitable.[1] A net wealth tax that included human capital values in its base would have the interesting tendency to lighten its burdens as the taxpayer approached the end of his working life, unless, of course, the decline in his personal capital value were offset by increments to his holdings of material assets. Although it might be very difficult to design a tax on nonhuman wealth for the lower income groups so as to impose on them, as Goode assumes, approximately the same burdens as under an income or spendings tax, similar problems would not arise for the broader-based tax here suggested.

My second, and last, reservation has to do with relative tax effects on investment incentives. In his discussion of this point, Goode compares a wealth tax with a tax on realized income and notes the importance of the earlier assessment of tax liabilities under the former when both are applied to growth stocks. If an annual tax on wealth is practicable, however, a tax on accrued income, including capital gains and losses, is equally feasible; and as Simons, Vickrey, and others have argued, income taxation on an accrual basis is more equitable than taxation on a realization basis. The appropriate comparison, therefore, seems to me to be between a tax on wealth and one on accrued income; and when this is made, the timing differences of the two taxes are minimized.

One characteristic of general income and spendings taxes that typically receives little attention is their incidence, and I should like to devote the remainder of my remarks to that topic. To illustrate the issues involved, let us assume a full employment economy in which, unless positive monetary or fiscal action is taken, consumer expenditures and prices are expected to rise by 10 per cent, resulting in the following simplified set of national accounts:

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[1] For a fuller discussion of these matters see Earl R. Rolph and George F. Break, *Public Finance* (Ronald Press, 1961), pp. 196-200. For a recent set of estimates, see Burton A. Weisbrod, "The Valuation of Human Capital," *J.P.E.*, Oct., 1961, pp. 425-36.

Government output,	G	100	Government income (taxes minus transfers),	Y_G	70
Private investment,	I	100			
Consumption,	C	330	Private income,	Y_P	460
Gross National Product,	GNP	530	Gross National Income,	GNY	530

Suppose now that a general consumer expenditures tax with a yield of 30 is imposed and that the price elasticity of aggregate consumer demand is equal to unity. Such a tax plan has opposing, and in the present instance exactly offsetting, effects on consumer prices. On the one hand, by reducing the flow of expenditures onto private consumer markets it lowers prices there; and on the other hand, by tying tax liabilities directly to total consumer spending it raises effective prices by the amount of the tax rate. Instead of the no-tax set of accounts given above we have, with the spendings tax in operation:

G	100	Y_G	100
I	100	Y_P	400
C	300		
GNP	500	GNY	500

Consumers still spend 330 in order to acquire consumer goods and services, but now only 300 goes to private business enterprises and 30 goes to the government. Effective consumer prices are not changed at all by the spendings tax, and the amount of private income available for consumption is reduced from 460 to 430, or by the amount of the tax yield.[2] Relative to the no-tax situation, spendings tax incidence is not on consumers but on factor owners in the consumer goods industries.

Spendings taxes need not, of course, have deflationary effects exactly equal to their yield to the government. If the price elasticity of aggregate consumption demand is less than unity, consumer prices with a spendings tax in operation will be higher than they otherwise would have been; and the incidence of the tax will be split between consumers and factor owners.[3] If consumers, for example, spend 310 on goods and services and pay additional taxes of 30 to the government (the tax rate having been adjusted to keep the tax yield the same as before), private incomes available for consumption are 440, or 20 less than in the no-tax situation, and consumer prices have risen by 40/300 = 13.3 per cent instead of by 10 per cent in the absence of a spendings tax. Should consumer demand, on the other hand, be highly price elastic, a spendings tax would actually reduce prices and lower incomes available for consumption by more than the yield of the tax.

Let us turn now to the price and income effects of an income tax increase also yielding 30 to the government. At one extreme we have Kaldor's position with respect to short-term tax changes; namely, that while a temporary spendings tax is likely to have important deflationary effects, a temporary income tax increase may have none at all.[4] For such an anemic income tax our national accounts would be as follows:

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[2] We are here taking total private income minus all taxes not directly tied to consumer expenditures.

[3] Should consumer demand be completely inelastic so that the tax has no deflationary powers, incidence would be entirely on the consumer.

G	100	Y_G	100
I	100	Y_P	430
C	330		
	—		—
GNP	530	GNY	530

Note that consumer prices here would be at exactly the same level as under our first spendings tax (unitary price elasticity of consumer demand) or in the no-tax situation. In this rather special case, differential spendings tax incidence is not on the consumer but on factor owners, disposable private incomes being 430 with the income tax but only 400 with the spendings tax.

More traditional conclusions emerge as we increase the deflationary powers of income taxation. If we compare income and spendings taxes with equal effects on private spending and yielding equal amounts of money to the government, disposable incomes will be the same under either tax, but consumer prices will be higher under the spendings levy by the amount of the tax:

Spendings Tax				Income Tax			
G	100	Y_G	100	G	100	Y_G	100
I	100	Y_P	400	I	100	Y_P	400
C	300			C	300		
	—		—		—		—
GNP	500	GNY	500	GNP	500	GNY	500

Differential spendings tax incidence now rests entirely on the consumer. Probably most economists would regard a spendings tax as more deflationary than an income tax of equal yield. If this is true, spendings tax incidence, according to our analysis, would be divided between consumers and factor owners in varying proportions.

The analysis just presented is much too limited to permit any general conclusions concerning spendings tax incidence, either absolute or differential. In the specific budgetary situation considered, however, and it is an important one for policy-makers, spendings tax incidence appears not to be confined entirely to consumers, but to be divided in some fashion between them and factor owners depending on the strength of the effects of both income and spendings taxes on the level of consumer expenditures.

Otto Eckstein: Tax devices to stimulate investment have certainly been the greatest fad in economic policy of the past ten years. In a period when the trends in the use of policy instruments were in the direction of more general, less selective devices, all sorts of liberalized depreciation schemes, investment allowances, and tax exemptions were embraced with enthusiasm all over the non-Communist world. The scientific evidence on the efficiency of this family of policy instruments is certainly meager. Then why this popularity with governments of a wide range of political complexions?

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[4] Nicholas Kaldor, *An Expenditure Tax* (London: George Allen and Unwin Ltd., 1955), pp. 176-78.

In part, of course, the reason lies in the desire for high rates of growth. Governments have rather limited means to promote growth, and even lesser means that do not arouse strong political opposition. The examples of high-growth Western countries that have extensively utilized these schemes also are fresh in mind. Conversely, when the real investment opportunities are very great and when business clearly faces a capital shortage, it is only common sense for government to make investible funds available by these means.

However, I believe there is also a sociological explanation. The tax incentives represent an accommodation between governments that need high tax rates to finance their vast activities and the professional managerial class which is in the business of investing corporate capital. The managers, with their loyalties to the profitability and growth of their corporations, are content to see the rising flow of investible capital generated by liberal depreciation allowances; the governments maintain the high tax rates that they need.

I think it is not a bad bargain for the society. We do rely on the corporate institution for the expansion of the private sector and we had best supply it with the funds it requires. The redistribution of income that is involved primarily benefits the corporations who add to the nation's capital stock, not to stockholders who might consume the tax benefit. In this respect, across-the-board rate cuts are inferior.

The main growth-stimulating alternative is a substantial loosening of interest rate policy. Professor Brown toys with that idea, though the balance-of-payment constraint keeps him from endorsing it. I am more skeptical of this route. From what little we know of the sectoral incidence of monetary policy, we can conclude that its major impact is on housing, and that, in general, it chiefly affects long-lived, low-risk investments which can be financed by borrowing. While neither the tax incentive devices nor ease in monetary policy provide much capital for really new enterprises, I believe that the tax devices are more favorable to risky ventures. They provide equity rather than debt capital, and they do not introduce the conservative biases of financial institutions into the investment decisions.

Should the United States take further steps along these lines? The countries that pioneered the way appear to be moving in the opposite direction. Sweden gave up its system of free depreciation in 1955 and has tightened the write-off methods further in recent years. In Germany, where a wide distribution of property-holding is a goal of policy, depreciation was tightened but tax rates were cut; also, where retained earnings had been favored by the tax law in early postwar years, they are now slightly penalized. Thus, Germany is betting less on internally generated capital for its growth than she did at an earlier stage.

Nevertheless, I favor additional steps for the United States. Our economic system has traveled too far down the road of relying on corporations for the accumulation and management of investible funds to change direction now.

We do want to accelerate our growth, and apart from aid to education, no other structural measure holds out equal promise.

But can we expect much beneficial effect from investment incentives while our existing capital stock is underutilized? Our knowledge on this matter is very limited, but I would use the following as the best working hypothesis: some positive effects are inevitable, since the distribution of excess capacity is not uniform and some cost-saving investment will pay even with excess capacity. On the other hand, the effect will be greater in better times, when more businesses find their financial resources strained in relation to their investment opportunities.

Finally, what about the particular design of the incentive device? Professor Brown presents some interesting analyses of that problem. Let me raise only this point: the design question is usually viewed in terms of *ex ante* investment calculations that presume businesses to be rational present-value maximizers. This approach favors tax credits over more liberal depreciation. Perhaps this is the only engine of analysis that we possess; but it has its limits. Actual business criteria may be of a different form, perhaps involving before-tax figures, utilizing depreciation lives for replacement decisions, or using other rules of thumb to make possible decentralized decision making in large organizations under uncertainty. Under other criteria, different optimal designs emerge. While I would place some emphasis on the *ex ante* computations, I would also stress the implications of the policy instruments on sound accounting practice, particularly with regard to income measurement, on the likelihood that the tax benefit will actually wind up as investment and not as dividend, and on the feasibility of confining the device to assets which will add importantly to the productive potential of our industry rather than providing haphazard windfalls.

MELVIN I. WHITE: There are two points about Professor Prest's absorbing paper to which I would like to give attention. The first concerns the form of his estimating equations. The second concerns the evaluation of his quantitative results.

The relationships between tax yields and personal income in the Prest equations are linear, implying an unchanging ratio of Δ tax yield to Δ personal income—or, to use his term, an unchanging community marginal tax rate. It is quite true, as he notes, that for policy purposes the relevant aspect of automatic responsiveness of a fiscal structure is the absolute change in tax yield associated with a given change in income. However, this does not really set a criterion for choice of an estimating equation. The best equation, of course, is the one that may be expected to forecast tax yields from given income levels most accurately, taking due account of the logic of the relationship as well as the statistical fit. The community marginal tax rate, as such, can always be computed for any given situation.

I feel uncertain about the conception of the community marginal tax rate as a stable parameter, even on a *ceteris paribus* basis. Prest's own cross-section analysis is initially developed in terms of an elasticity, which suggests that the community marginal tax rate is itself a function of the level of income. A nonstable marginal tax rate is also strongly suggested by his calculations from quarterly data for the U.K. and by Cohen's data for the U.S., which he cites.

On a priori grounds, too, it might be expected that given the nature of various provisions for exempting income from taxation, the proportion of increments in personal income that became taxable would rise with rising income. And one naturally expects that a progressive tax system would produce a rising marginal tax rate as income rises (although this may be obscured by offsetting shifts in the distribution of income). Finally, for the U.S. Brown and Kruizenga have developed what are evidently good estimating equations (*Review of Economics and Statistics*, August, 1959) in which the marginal responsiveness of taxable income varies with per capita personal income (and also, by the way, with the exemption structure).

To turn now to his quantitative results, Professor Prest suggests a final figure of .18 ± .02 for the marginal tax rate under the 1959-60 schedules. The .02 is not to be taken as a standard error, but covers a range of coefficients estimated by alternative methods; the best of the standard errors of his regression coefficients actually range from .03 to .06. At the 5 per cent level the range of his confidence interval would thus be at least from .12 to .24.

What is the significance of these figures from the viewpoint of stabilization policy? Or perhaps better expressed, how much difference does it make whether the marginal responsiveness of the individual income tax is, for instance, as low as .12 or as high even as the .3 that Prest estimates to have prevailed under the 1949-50 schedule? He himself expresses some disappointment at a marginal tax rate of only .18, referring to it as a fairly small mouse.

The significance of figures for the marginal responsiveness of fiscal structure is best undertaken, it seems to me, in the context of a simulation model, where the consequences of differences can be related to the magnitude of the stabilization problem. This can be done most readily by assuming a given change in aggregate income and then measuring the comparative effectiveness of alternative marginal tax rates by the resulting differences in the permissible amounts of change in autonomous demand consistent with the assumed change in aggregate income.

For illustrative purposes I have made some calculations for the United States, utilizing the recession models presented by Duesenberry, Eckstein, and Fromm in the October, 1961, issue of *Econometrica*. The decline in GNP in one of their models is 4½ per cent (quarterly data at annual rates) which is larger than the 2½ per cent actual decline in the 1957-58 recession. For this model, my computations indicate that each increase in the marginal tax rate on personal income of .10 permits *ceteris paribus* an additional half billion dollars of decline in autonomous demand. If a larger downswing in GNP is assumed—the 8 per cent of their "disaster" model—an increase of .10 in the marginal tax rate will permit an additional one to one-and-a-half billion dollar decline in autonomous demand. These computations illustrate not only that the smaller the decline in aggregate income, the smaller will be the automatic contribution of a given fiscal structure, but also that the smaller will be the incremental contribution obtainable from a more responsive fiscal structure.

On the basis of these calculations, a range of uncertainty in the estimation of the community marginal tax rate of .12 (the range for Prest's figures) implies that, depending on the extent of the recession, the uncertainty in the amounts of decline in autonomous demand that may have to be compensated for ranges between one-half billion and two billion dollars. This is, of course, incremental to other forecasting uncertainties.

Whether these figures represent economically significant differences among marginal tax rates depends on the availability and flexibility of alternative policies. The whole issue of built-in flexibility of the individual income tax (at least at unchanging statutory rates) may well be diminishing in importance. This, no doubt, reflects the rising community expectations as to the degree of stability in aggregate income it will successfully achieve, the effectiveness of other built-in stabilizers such as transfer payments, corporate profits taxes, and undistributed profits, and perhaps a growing awareness of the potentialities of countercyclical variation in income tax rates.

In any event, I would say that the above mode of evaluation is appropriate for answering the question of how far the community should go in building automatic flexibility into its fiscal structure. And it perhaps may also be helpful in answering the question of how far it should go in allocating the high level of skill and ingenuity displayed by Professor Prest to the pursuit of better techniques for estimating marginal tax rates.

SYSTEMS OF ECONOMIC ACCOUNTS AND ANALYSIS FOR URBAN REGIONS

A NATIONAL SYSTEM OF METROPOLITAN INFORMATION AND ANALYSIS*

By HARVEY S. PERLOFF
Resources for the Future

The more the population and industries of the United States cluster into metropolitan regions, the greater becomes the need to develop a fitting information capability within these centers. Such a capability needs to encompass a number of elements, ranging from an intergovernmental system of data collection to annual interpretive reporting of the Council-of-Economic-Advisers type, supplying a firm informational base for public policy and private decision making.

This paper outlines some major requirements for information about metropolitan regions and suggests possible approaches to meet them. It proceeds on the assumption that, while economists and other social scientists might not want to climb every intellectual "mountain" simply because "it is there," the social significance and inherent intellectual challenge of a field of inquiry are highly relevant to decisions on priorities in research and related efforts.

Decision Problems in the Metropolis

The impacts of urbanization are so far-reaching and complex and the potentialities for environmental improvements are so tantalizing that both governmental and private groups find themselves faced with a host of difficult problems. For present purposes, such problems can usefully be characterized as essentially related to (1) the metropolis seen as an integral part of the nation and as subject to national (as well as large-regional) forces, and (2) the metropolis seen in terms of its own special structure and as directing and controlling at least some of the "internal" elements.

One set of problems of the individual communities stems from the tie of urban growth and change to national development. Thus, the close bond between Detroit's economy and the national auto market could in a short period of time plunge the area from a situation of rapid growth into one of distressingly high unemployment. The metropolitan region is a labor market perhaps more than any other kind of identifiable entity, and it is within this arena that one of the most pressing domestic economic problems of the sixties must be resolved: structual "hard core" unemployment. This problem has local policy implications, and may well be amenable to local action, to a much greater degree than cyclical unemployment. In a more general sense, it is evident that metropolitan communities are at all times deeply involved in adjustment to the pervading influence of the national economy.[1] The development of policy to guide adjustment manifestly requires a broad informational base.

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* I am grateful to my colleagues, Jack Lessinger, Wilbur Thompson, and Lowdon Wingo for the many valuable suggestions they made in reviewing an earlier draft of my manuscript.

But adjustment to exogenous forces is not the whole story. The metropolis is a significant entity with a development of its own. Within the framework of the broader forces, a community can do many things to make a great deal of difference in the lives of its people. Pittsburgh proved not only that a smoke pall can be eliminated but that the downtown areas can be given new vitality through urban renewal programs (the Golden Triangle development is a big part of the new image of Pittsburgh). Unfortunately, urban improvement is no simple matter. As can be seen merely by reading the daily papers, the increasing concern with urban matters can too easily be dissipated on the superficial irritants or encourage political-economic coalitions which can gain mightily from large public outlays: the pouring of cement, though often highly lucrative, does not always yield a net gain for the community.

The public decisions that have to be made within the metropolitan region are extremely complicated. First, most of them involve both production and consumption considerations: the metropolis is simultaneously a place to live and a place of work. Factories and stores, homes and schools and churches all have to be provided for. It is well and good to protect the pleasantness of home environments by isolating the factory areas, but this may also mean that the breadwinners buy this amenity at the cost of a lengthy commuting trip that reduces time at home with the family. All this suggests that alternative proposals must continually be tested for their impacts on the effectiveness and viability of both the producing and consuming functions.

Second, externalities are crucial in the organization and functioning of the metropolis. The very forces that permit productive activities to exploit economies afforded by clustering and high density tend to bring in their wake extraordinarily high rents and construction, servicing, movement, and "discomfort" costs. Thus, decisions in the metropolis inevitably involve a delicate balancing of advantages and disadvantages—often of unlike things and unlike categories—which resist being reduced to the common denominator of market value.

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[1] Raymond Vernon and his group have spelled out what this means in the case of a large metropolis like New York (and the people of New York are still shuddering at some of the findings). See especially the summary volume of the New York Region Economic Study: Raymond Vernon, *Metropolis 1985* (Harvard Univ. Press, 1961).

The problem of equity is also ever present: for example, the prettifying of an area through urban redevelopment can shift high costs onto the former slum dwellers, and it is only too easy to subsidize auto owners at the expense of those who cannot afford or do not choose to use the automobile for personal transportation. There is clearly a long overdue need to devise new pricing techniques which can weigh both economy and equity in a more effective manner than is generally done today in the pricing of our public services and facilities.

Business firms and individuals look to the government[2] to help maintain production efficiency and family livability through social overhead and social controls. This governmental responsibility is expressed in enormous capital investments and service expenditures as well as in extensive laws and regulations such as land use controls and building codes. Thus, public expenditures, public planning, and public control become key weapons in the struggle to maintain viability and livability.

The first priority among informational needs, then, must be assigned to more adequate factual and analytical support in the design and use of these public levers. Even if we cannot expect for some time the tools to make fine judgments and fine distinctions, we may avoid large and costly errors with a perspective of broad implications and rough over-all costs and benefits attached to alternative decisions.

Cutting across all of these public issues and raising a number of ticklish questions of its own is the matter of local government finance. The problems associated with the property base of local taxation are too well known to require elaboration here. In addition, there is a tendency for divergence between expenditures and revenues. Considerations of efficiency and quality generate in many instances a pull toward metropolitan-wide considerations (as in the development of transportation networks) or toward common-base professional standards (apparent in the pressures on public school expenditures). Local revenues, on the other hand, are characterized by extreme parochialism, with the contest for tax sources among taxing jurisdictions often unrelated to service burdens. Thus, the very organization of government finance in the metropolitan setting raises an array of thorny questions.

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[2] "Government" here is necessarily a collective term, since the pressures tend to spill over so that if the local governments cannot meet their responsibilities, people look to the state and federal governments. With most economic activities and most of our population located in the metropolitan regions, pressures from below become increasingly potent politically and higher level government responses can be counted on.

Decision making by individual families and business firms within a metropolitan environment is equally complex. For example, the family must consider the job-getting and income-earning possibilities simultaneously with the attractiveness of family living in a given metropolis and within its various parts. (That is, household location between and within urban areas is more open to choice for the metropolitan than, say, the farm family.) Similarly, every business must consider not only the obvious elements of rent and ease of shipping goods and services but also its ability to tap an adequate labor force at an advantageous wage cost. Decentralized decision making by households and business firms is an important value in our society—for both philosophical and practical reasons. The achievement of this value depends in no small part on the adequacy of the information which is made available to such private units. With good data, it becomes far easier to rationalize production and consumption—to weigh the advantages and disadvantages of alternative possibilities with regard to location, technology, and markets.

Some Major Needs

To some it would seem that a spelling out of these issues is an elaboration of the obvious, but if that is so, the obvious is eluding a great many people. We are today very poorly equipped within our urban communities to develop a deep understanding of the problems involved and to be in a position to make rational decisions to cope with them (not to mention the hopeful possibility that we might begin to tap some of the great potentialities in a rich nation for the development of truly attractive urban environments).

We do have some resources and some guidelines to work with, however. Fortunately, we have had the leads provided by a number of comprehensive economic studies, including the New York Region Economic Study and the Pittsburgh study under the leadership of Edgar Hoover, as well as the work of a small group of pioneering scholars. Also, the Committee on Urban Economics of Resources for the Future has been probing for some time the central issues and methodological techniques involved in advancing research in five substantive areas: (1) national-regional structural relationships and metropolitan economic growth, (2) spatial organization of the metropolis, (3) urban services and welfare, (4) the "economics" of human resources, and (5) regional accounts. In each of these areas, conferences and study seminars have helped to reveal the major questions deserving research attention as well as the data needs.[3]

Thus, I believe we are now in a position to see some of the main informational requirements for urban decision making, and it is clear that cities alone cannot fully meet the requirements. A national system of urban information-provision is called for. This would involve substantial contributions from federal and state agencies as well as from local agencies, and, of course, from individual scholars and research organizations. In addition, we must take the next steps from our present state of *ad hoc* studies carried out here and there into a situation where every major community will have an ongoing system to bring information to bear on current problems. The Pittsburgh Economic Study is currently addressing itself to this very issue, and a major result of its effort may well be the development of a permanent operation to provide economic intelligence for decision-makers in the Pittsburgh region.

There are many ways of looking at the far-reaching informational needs of the metropolitan regions. From the standpoint of decision-making requirements, these needs can be usefully generalized under the headings of: (1) metering, regional accounts, and reporting, (2) growth projections, (3) impact or interaction analysis, and (4) evaluation of specific programs, projects, and policy alternatives. These are all closely interrelated but each has its own special characteristics and each poses its own special intellectual and practical problems.

1. *Metering: The State of the Community.* Here the lesson from national accounts and analysis is particularly appropriate. Try to conceive the making of national economic policy without the use of the national economic accounts and the analysis based on them, together with related information, by the Council of Economic Advisers and other public units.[4] Such an eventuality was colorfully summed up by a member of the Council when he was asked about the use it made of the national accounts: "Without these accounts we would still be looking at the million and one bits and pieces of data on items like retail sales, bank deposits, and carloadings—very much like the medicine man looking at the entrails of a chicken."

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[3] The Committee on Urban Economics is an interuniversity committee consisting of economists and members from other social sciences which seeks to strengthen contributions to the field of urban economics. The major focus of the Committee's efforts is on (1) education and research to improve knowledge and understanding of how the urban economy is organized, how it works, and how it tends to change; and (2) on improved information, analyses, and models for public and private decision making in urban communities.

[4] Along the same lines, it is well to consider the extent to which business enterprises would be handicapped, particularly in making long-range investment plans and marketing arrangements, if they could not rely on the regular provision of national accounts and the data provided by the Bureau of the Census, Department of Labor, and other units of government.

Information about our metropolitan region is still very much in the "entrails" stage (and, as a matter of fact, even the entrails are hard to come by). Our understanding will be greatly strengthened and analysis made more feasible when data are arranged into meaningful integrated systems. The only subnational accounts hitherto provided on a comprehensive and regular basis have been the annual state income data furnished by the Department of Commerce. Plans are now being made for the publication of income data for the major metropolitan areas. In addition, concepts and methods for interindustry flow accounts, based on the pioneering work on regional input-ouput models by Leontief, Isard, Moses, Moore and Petersen, Hirsch, and others, are being worked out and should soon be ready for general application.[5] The main items are information on the purchases and sales, the value-added, and the income paid out associated with each of the major industry groups within a metropolitan region.

Systematized record keeping on stocks as well as flows is a vital need. While it is understandable why asset or stock accounting has not played a central role in national economic accounting and decision making, given the nature of federal decisions, at the local level these are core items and deserve detailed attention. Public decisions are made daily in urban communities which directly affect people and properties; yet little is actually known in most communities about them. It is a rare community indeed that makes a continuing inventory of its land and buildings in spatial, use, and value terms, in spite of the fact that zoning regulations, subdivision controls, property taxes, and provision of services and facilities have a direct and powerful affect on properties and in turn are continually influenced by them.

Equally important is an inventory of the human assets: what kinds of people are in the community, what kinds are coming in, and what kinds are leaving. This type of knowledge touches directly on planning for education, health, housing, employment, welfare, and many related services and facilities. Basic information on property and population must be available, not only for the metropolis as a whole, but for its parts as well, particularly since service requirements and revenues are influenced both by land-use and values and by the socioeconomic characteristics of the people who live in the various neighborhoods and taxing jurisdictions.

But metering alone, as significant as it is, is not enough. The record must be analyzed to detect the major changes taking place, and the problems they foreshadow must be brought to the forefront. Hence, a metropolis would do well to provide for the preparation of an annual

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[5] For a detailed discussion of this subject, see the articles by Hirsch, Leven, Perloff, and Ruggles in the forthcoming volume, Committee on Regional Accounts, *The Design of Regional Accounts*, edited by Werner Hochwald (Johns Hopkins Press, 1962).

"state-of-the-region" report which would present the key data and analyze their implications, somewhat in the manner of the state-of-the-union message presented by the President. Both public and private decision-makers could then prepare their plans on a more solid base of information.

2. *Projections of Growth in Population and Economic Activities and of Structural Changes.* A large proportion of the major decisions made by public and private units center on estimates of future growth and change in the structure of the region's economic activities and population. This is true of investment decisions, of plans for public services, and of private marketing arrangements. Such projections are essential to decisions ranging from the need for major changes in transportation systems to the future needs of special remedial reading teachers (due to a change in the educational status of the population with a large volume of in-migration).

Given the fluidity of the American economy, the projections of urban growth and structural change are demanding tasks. Their inherent importance, however, suggests high priority attention in spite of all the difficulties involved. Since the central elements in such projections are specific industry studies, and since they involve an "allocation" of total population and economic activities among all the communities of the nation, such projections clearly call for a two-way type of analysis. A thorough overview of the evolving locational requirements of the various major industrial groups and the relative advantages of the different regions to meet these requirements is needed for the whole nation. Such a "from the top down" view can best be carried out by some national organization equipped to carry out detailed industry studies as well as studies of migration patterns and other elements entering into the allocation among the regions of the country of population, jobs, income, value-added, and the other key elements. The other view is from the individual metropolis on up. From this point, the forces at work within a given metropolis need to be examined and the national projections checked out and amplified.

The making of such projections would be greatly helped by periodic data for interindustry, interregional analysis. The current study of interindustry purchases and sales by the Department of Commerce and the projected plans for continuing study of interindustry relations points up the possibility of extending its work to subnational areas. The wealth of Census information available for 1958 and 1960 suggests that a start on interregional flows can be made at the present time.

3. *Impact or Interaction Analysis.* Public and private plans within metropolitan regions often depend upon estimates of the impact on a

given community of anticipated national changes and other exogenous forces. Thus, each community needs an understanding of the potential land requirements for industry and housing which continuing industry shifts may create, as well as the implications for employment stability of a changing industrial structure. The specific items to be played through an impact analysis depend, of course, on the interests of the public or private bodies making the analysis. This is a key subject in Werner Hirsch's paper and therefore need not be elaborated here.

At the present time, governments seem to work in an atmosphere of continuing surprises, always trying to cope with crisis situations which have developed while no one seemed to be looking. Actually, most important developments tend to have a fairly long lead time—this is certainly true for technological change and the slow, steady transition to a service economy—but someone has to be concerned with recording and analyzing the changes which are under way if forewarned is to be forearmed.

4. *Evaluation of Specific Programs, Projects, and Policy Alternatives.* Certain types of very broad policy alternatives could usefully be played through the interaction model to test out on paper the kind of impacts which might be anticipated, such as those related to the attraction of certain kinds of industries or drastic changes in the community's land subdivision policy. However, most decisions in government center on quite specific and fairly limited programs and projects. Here, evaluation can most logically proceed through the comparative analysis of costs and benefits. The water resources field alone has tapped the potentialities of cost-benefit analysis in a serious way. However, the nature of the choices which confront urban communities suggests the need for cost-benefit analysis on the urban scene. For example, my guess would be that a great many of the urban redevelopment and renewal projects would not have been undertaken in their present form if a full analysis had been made of the impacts on various groups in society of the supply of housing, of changes in the home-to-work transportation requirements, and of the long-run costs to the community. This kind of financial appraisal and evaluation of economic and other impacts will require a substantial amount of information of the type which has already been spelled out. The development of the concepts and measurement tools needed for the effective application of cost-benefit analysis to urban programs and projects offers an intriguing subject for research and experimental application.

Concrete Next Steps

Economists and other social scientists have played a very large role in laying what is by now a fairly sturdy informational foundation for national economic policy, including serious attention to data improvements, the development of national economic accounts, a continuing struggle with the many conceptual and analytical issues, and help in the design of institutional devices such as the Council of Economic Advisers. The same type of role is now called for to help urban communities to cope with the many difficult problems they face and to assist the federal government evolve its urban policies.

In this paper I have tried to highlight some of the key elements that deserve attention. These can be summarized under two categories: the institutional needs and the research questions. On the first count, the complexity of matters at the subnational scale calls for a number of new "institutional" contributions: (1) a national unit to provide, on a periodic basis, flow accounts for the states and the larger metropolitan areas, covering for the major industry groups purchases and sales, value-added, and income paid out; (2) a national unit to provide periodic growth and change projections for the metropolitan regions covering such key elements as population, income, employment, and production, through continuing study of changing industry requirements and migration patterns; (3) local units to maintain asset accounts covering property and people; and (4) metropolitan units to prepare periodic state-of-the-region reports which can keep governments and private groups informed, with an overview, of the changes which are taking place within the metropolis as well as those anticipated. Such metropolitan units would be major consumers of the output of the agencies referred to under items 1, 2, and 3.

The research needs clearly include the studies for making the above feasible and fruitful undertakings. Thus, for example, there are many conceptual and methodological problems to be solved in making the regional accounts powerful informational tools. In a larger and more appropriate sense, the great challenge is to evolve through research a deep understanding of the major forces at work in urbanization, of the relationship between metropolitan change and national development, and of the approaches which might be employed not only in coping with the problems of adjustment to exogenous forces but of achieving a better urban life through community investment and effort.

DESIGN AND USE OF REGIONAL ACCOUNTS

By Werner Z. Hirsch
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I. *Introduction*

The urban population of the United States in 1970 is likely to equal the total population of this country in 1950—about 150,000,000 people. Such a rapid increase will, of course, create many new urban problems and aggravate some that we already have. Among them are overcrowded core cities, inadequate housing, traffic congestion, social disorder and crime, air and water pollution, plight of the aged, fiscal crises of local governments, migration of new ethnic groups into decaying and sometimes hostile neighborhoods, the lack of sufficient community organizations geared to help solve these problems, etc. All of these factors and many more add up to a situation in urban America which poses a serious menace to the urban community.

To shed light on these problems and enable us to anticipate and evaluate forces affecting regional economies, we shall need a powerful framework, implemented by relevant data. Such a framework can be constructed in the form of a regional interaction model. With this tool, we might be able to trace and appraise the effect of a variety of stipulated forces on the over-all health and well-being of the regional and subregional economy. Regional accounts provide a promising method of implementing a regional interaction model, so that significant data can be arranged into meaningful integrated data systems.

II. *Regional and Intraregional Decisions*

Regional decisions are made by private industry, by local, state, and federal governments, and by voluntary service agencies. Some are made for the purpose of deliberately affecting specific activities within a region; others are formulated for reasons unconnected with regional activity. The latter, however, frequently produce incidental side effects. Regardless of intent, then, both types of decisions are of equal importance to the regional economy. It is hoped that their impact can be traced and evaluated within a regional interaction model. It can then stimulate the formulation of alternative policies and help evaluate their implications.

A regional interaction model is a generalized decision-making model and can be schematized in the following manner: Four boxes are wired together. Box one contains external forces and is wired directly to boxes two and three, representing internal private sector environment and internal public sector environment, respectively. Boxes two and three are also wired to one another. All three boxes, in turn, are wired ot box four, representing the status of the region's health and well-being.[1]

In a sense, boxes one, two, and three contain inputs, while box four registers the joint consequences flowing into it. There are, of course, numerous feedbacks. There is a constant flow over the circuits from boxes one, two, and three to box four. Of particular concern, however, are those changes which occur in boxes one, two, and three as a result of the initiation of some action. As any element in boxes one, two, and three is altered, i.e., an initial stimulus is provided, a flow through the circuits takes place, and ultimately changes in the region's health and well-being register in box four.

Before the impact on a region's health and well-being can be assessed, its major dimensions must be clearly identified. Five main dimensions have been proposed: per capita real income, basic employment stability, net social benefits, economic growth, and amenities of life.

It is useful to distinguish between regional and intraregional decisions, i.e., those which affect the entire region, and those which produce reactions varying in manner and intensity on the different parts within a region.

Decisions can originate outside a region's boundaries. External forces which mainly affect the entire region are various kinds of federal government actions; state governmental actions relating to education, industrialization, recreation, public welfare, regulations, etc.; level of economic activity; technology and productivity; transportation system and transportation costs; resources picture; etc.

Then there are internal forces. State and local governmental actions generally affect the entire region. Decisions made by these governmental units encompass region-wide planning and regulation of land and other resources, and cultural and certain social activities. The latter two responsibilities are also frequently handled by voluntary service organizations; i.e., museums, hospitals, welfare agencies, etc.

Intraregional policy decisions can be made by local governments and voluntary service agencies, as well as by private industry and commerce. They involve education, fire and police protection, land use planning and regulation, water, sewage, traffic and transit, taxation, and such amenities of life as cultural activities, recreation, parks, and beaches.

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[1] For a more detailed discussion, see Werner Z. Hirsch, "Regional Accounts: Objectives and Framework," *Proceedings of the Bus. and Econ. Statis. Sec., A.S.A.* (1959), pp. 282-90; Lowdon Wingo, Jr., *Transportation and Urban Land* (Resources for the Future, 1961), pp. 5-9.

Private actions affecting intraregional policy decisions relate mainly to the location of plants and business establishments. These activities provide employment, generate traffic, require public services, and necessitate the payment of taxes.

III. *Accounts for Regional Decisions*

The implementation of such an interaction model calls for a three-level flow system; i.e., integrated national, regional, and intraregional accounts. National accounts are important for the derivation of regional final demand and can be checked against the aggregates of regional totals. Regional input-output accounts make possible the estimation of effects of original stimuli on regional totals. Regional totals, in turn, are necessary in order to make an analysis of intraregional economic activity. In many cases regional totals need to be allocated to subregions. Just as national totals help check the reasonableness of regional totals, so subregional totals can be used to check regional totals.

A key element in the three-level flow account, especially for regions with substantial internal goods and service flows, is the regional input-output account. It helps estimate direct impacts, as well as indirect and income-induced ones within the regional interaction framework.

The structure of the regional input-output account should be consistent with the three-level accounts framework. Thus, the local processing matrix might have the following eight sectors: agriculture, manufacturing, trade and services, construction, households, local government, voluntary service agencies, and land requirements.

Lumping persons into a single household sector is often unsatisfactory. For instance, service requirements vary according to age, sex, race, income, etc. If possible, therefore, the regional household sector should be divided into subsectors.

The local government sector may be divided into county government, municipal governments, school governments, and other special districts. Some studies will seek answers to the question of whether or not a local industrial development will permit a reduction in tax rates, without changing either the quality of the services or the price level. A balanced regional input-output model can generate regional employment and output and income multipliers to estimate tax base, as well as activities requiring public services. With the aid of fiscal side calculations, revenue and expenditures are estimated. An alternative approach would modify the regional input-output account.

The voluntary service agencies sector should dovetail and complement the local government sector. Services which in one city or metropolitan area are furnished by local governments often are provided in other areas by voluntary agencies and vice versa. For this reason, it will sometimes be useful to combine the local government and voluntary agency sectors.

Land requirements are a key sector and an important link between regional and intraregional accounts. They should be represented in physical units and should be divided into urban and suburban land to permit geographical identification, since per worker space requirements are substantially larger in suburban plants than in urban ones. Three further categories might be used: floor space, parking space, and land reserve and other space needs.

For most purposes the final demand matrix of the regional input-output account will be composed of federal government, state government, gross capital formation, and export sectors. To complement the local government sectors in the processing matrix in a useful manner, the state government should be divided into school and non-school sectors. Depending on the importance of exports to the region, and the diversity of industries, export industries will be presented in detail.

If the regional impact of external forces is to be estimated, their effect on the local processing and final demand matrices must be assessed first. Harvey S. Perloff has suggested treating this problem within the confines of a regional growth model.[2] Insofar as the impact on regional final demand is concerned, it might prove useful to start with the projected national demand for various products and services and then translate these figures into total production by industry classes. Gross value, value-added, and employment figures must then be allocated among the various regions. In addition to the supply allocation, purchases would also need to be allocated on a regional basis. The supply and demand interrelationships would have to be worked out by successive approximations. In part, changes would reflect the relative economic advantage of the region's industries. In a similar manner, changes in the technical coefficients could be estimated. Input-output accounts can also be applied to a regional impact analysis of growth, basic employment stability, per capita income, foreign trade, social services, net fiscal resources, and urban land requirements.

IV. *Accounts for Intraregional Decisions*

Intraregional activities are basically person and place centered. They must be constructed in a manner that permits the articulation of the crucial activities of persons in relation to parcels and their links; i.e., street sections. A person works at a given site (parcel) and produces either public or private goods and services. In turn, these outputs are consumed by persons, at either the same or a different site; i.e., they become inputs of the person who works, resides, travels, or spends his recreation time. Land, therefore, is an important input for the person who renders private production in commerce and industry, renders public service, engages in recreation, and uses it for a place of residence. At the same time, street sections permit the movement of people and goods and their identification.

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[2] Harvey S. Perloff, "Relative Regional Economic Growth: An Approach to Regional Accounts," *Design of Regional Accounts* (Johns Hopkins Univ. Press, 1961).

Selection of an appropriate subregional geographic unit for which person, parcel, and street section information is to be worked into an account is made difficult because of government fragmentation and private industry's location considerations. Alternatives are self-contained communities of the region, division of regions by means of a co-ordinate grid system in tracts of one square mile in area, census tracts, city blocks, and local government decision-making jurisdictions.

A preliminary examination reveals that not a single one of these units is a useful building block for making many intraregional decisions. It appears best to gather data on the basis of the smallest possible unit, i.e., person, parcel, and street sections, and then combine them into different geographic units depending upon the specific objective. The units should be such that the subregional accounts can be aggregated into the general regional account. A specific subregional account would pertain to that particular population which, for instance, is the recipient of a specific public service. The population and its wants would constitute the demand side and operating and capital expenditures for service the supply side.

Land requirements and population appear to be an excellent immediate link between regional and intraregional accounts. Projected regional land requirement and population impacts generated by the regional input-output accounts can be allocated into subregions with the aid of "holding capacity," "potential," or various "economic" models.

In selecting an appropriate industry breakdown for intraregional accounts, the sectoring of the other two levels of accounts, as well as the policy decisions to which intraregional accounts should lend themselves, must be considered. Since persons and land constitute an important link between regional and intraregional accounts, they will be included. Other sectors are county government, municipal government, school districts, other special districts, voluntary service agencies, industry and commerce.

The land sector in the intraregional account should reflect major land uses—rendering public and voluntary services, producing private goods and services, recreation, residential uses, and movement. A descriptive inventory of land makes clear how it is being used and should include information on the amount of land needed per worker in different industries.

The intraregional household account must be so structured as to help analyze the main decisions by and with regard to the region's people. Persons work at a given site and create output in the form of public and private goods and services. These space-oriented outputs become, in turn, the inputs of people who work, reside, engage in recreation and travel. People, both as consumers and as producers, have location characteristics in relation to government and voluntary service agencies. The household account should reflect them.

Using a person as the ultimate household unit offers many advantages. On the supply side, a person works, renders services, and pays taxes. Thus, persons might be grouped in terms of their output characteristics: sex, age, occupation, color, etc. On the demand side, a person's characteristics, for example, help identify different client populations, service by service.

Housing, however, is offered on a household basis. Since housing will tend to vary with family size, it might be desirable to reduce it to a per person basis also.

In relation to government services, state and federal government sectors can complement the four earlier mentioned local government sectors. Federal receipts and expenditures are very hard to allocate to a region. Information on receipts and expenditures should be assembled for at least three sectors—households, industry, and commerce. On the intraregional level, a finer breakdown of industry and commerce is unnecessary. Capital accounts should be developed wherever possible.

Government services are provided to people and for people, to parcels, and street sections. Thus, on the output side, government services need to be linked to people and land; i.e., those who demand services. People also pay for services; certain taxes are income-related while others are land and wealth-related. For this reason, then, government services need to be related to both persons and parcels.

In Table 1, an attempt has been made to present as an example a current subregional account for school districts.

Not all information can be presented in double entry form. For example, information on the condition of school buildings, their accessibility to a changing population, etc., can be recorded in a descriptive matrix.

The voluntary services account resembles the government account and can also be divided into a current and capital account. Virtually all current receipts come from the community itself. It is useful to separate the receipts by origin; i.e., industry, trade, services, household, and other. To achieve a better understanding of current receipts, data should indicate what contribution industry, trade, and services have made for voluntary services per dollar of output. Similarly, information for households should be collected on a per thousand dollar annual income basis. Expenditures could be given by major services.

Receipts for capital improvement can be divided into those coming from industry, trade, services, households, and government; and expenditures into acquisition of land, construction, remodeling, and equipment. Since the services provided by government and voluntary agencies vary greatly from region to region, it is important to enumerate clearly those that are offered on a voluntary basis. It might also prove helpful to distinguish between voluntary services which are available on an area-wide basis versus those which are not. The latter require major siting decisions for capital investment. The voluntary services account should also include much descriptive information.

TABLE 1

SUBREGIONAL SCHOOL DISTRICT ACCOUNT

I. Current Account	
A. Receipts	B. Expenditures
1. Local property tax	1. General control
2. Other taxes	2. Instruction
3. Tuition payments	3. Auxiliary services
4. State subsidy	4. Plant operation and maintenance
5. Federal subsidy	5. Fixed charges
	6. Debt service charges
C. Surplus or deficit (A–B)	
II. Capital Account	
D. Receipts	E. Expenditures
1. Local bonds	1. Land
2. State subsidy	2. New classroom buildings
3. Federal subsidy	3. New special activity buildings
4. Sale of assets	4. Remodeling
	5. Machinery and equipment
F. Surplus or deficit (D–E)	

A large portion of the services of voluntary agencies are contributed free of charge. For this reason, two separate sets of accounts should be set up: one relating only to monetary expenditures and the other including imputed voluntary man-hour contributions.

Finally, retail and personal service establishments are people-oriented. Thus, both private entrepreneurs and land use planners will tend to look upon people as the client population of these establishments. In order for these needs to be properly met, important land use decisions and capital investments must be made. Thus, on the demand side a clear link does exist between retailing, private personal services, people, and land.

V. *Data for Accounts*

Because intraregional accounts have three main building blocks—persons, parcels, and street sections—a unified information system must have two basic data files. One relates to real property and the other to persons. For street sections there would be a separate real property subfile. Firms would be dummy persons and cross-referenced to parcels.

The information system should be geared for the day when high speed electronic data processing equipment will be used by federal, state, and local governments. All this information will, in turn, be co-ordinated into one unified system.

The federal government, especially the Internal Revenue Service, is rapidly converting to an automatic data processing system which will provide a consolidated tax account for every taxpayer in the nation. Its objective is to facilitate processing, strengthen enforcement, and improve the revenue-producing operations of IRS.

The information system should avoid duplication of data collection and storage; it should provide easy and universal access to a virtually complete file of data describing each of the three building blocks. Properly organized, it should enable the user to check automatically for compatibility and it should permit the monitoring of unusual conditions which call for further attention.

Initially an SMSA-wide information system might have to be developed. It could serve as a clearing house for collecting, storing, and processing data designed to improve the information process and the implementation of regional accounts. Ultimately, the information system should be state-wide and possibly integrated between states by the federal government.

The basic data files will depend on federal, state, and local governments for information. For example, person data may be presented under seven main headings: Identification and Linkage Data; Demographic Data; Economic Data: Occupation and Profession, Permits, Employment, Income, Wealth; Education Data; Health Data; Welfare Data; and Law Enforcement Data.

An effort has been made to identify data that will be available for most SMSA's under these seven headings. So far about eighteen pieces of information have been developed under the heading of Identification and Linkage Data. To this total, about twenty Demographic Data, forty-six Economic Data, six Education Data, five Health Data, three Welfare Data, and five Law Enforcement Data should be added.

Parcel data may be represented under four major headings: Identification and Linkage Data, Physical Land Data, Improvement Data, and Economic Data. More than ninety data items have so far been identified.

Finally, street and road section data are presented under three main headings: identification and linkage, physical characteristics, and traffic characteristics. More than thirty-five data items have been identified up to the present time.

Most of the data collected for intraregional accounts will be useful for regional accounts. Data specifically needed for regional accounts are statistics on flows of goods and services between regions. They might be collected in physical terms, from bills of lading, rather than in value terms, and later translated into value terms.

The collection of flow information is a major undertaking. It might be advantageous to attack the problem by a nationwide approach. Regional accounts for all 212 SMSA's, plus the rest of the country, could then be assembled.

VI. *Summary*

I am more than ever convinced that our progress in urban research and our ability to improve the quality of urban decisions depend largely on three significant factors. These are: the rapid and efficient collection of all available data needed, a comprehensive system of accounts, and powerful models to analyze this information. To complement available data, we should establish a system of urban observatories in a number of key metropolitan areas, which would use mutually agreed upon survey methods to collect comparable and cumulative sets of data to further enrich both formal and descriptive matrices of regional accounts. A federal Department of Urban Affairs, once established, could assume major responsibility to guide, integrate, and encourage an ultimately nationwide system of urban information flow for improved decision making.

ORGANIZATION FOR DATA COLLECTION, ANALYSIS, AND REPORTING*

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The continuing growth of the nation's metropolitan regions has created an inexorable pressure for greater knowledge about the economies of metropolitan regions. Increasingly, the nation's population and economy is concentrated in urban clusters; 63 per cent of the nation's population currently resides in 212 metropolitan regions. The healthy economic development of these regions is vital, not only for the urban population itself, but to the national economy as a whole.

The first milestone in the urbanization of the nation was passed during the second decade of this century. More than 50 per cent of the nation's population was recorded as living in urban places. Only within the last ten to fifteen years has federal policy begun to catch up with this fact, though there is still a long way to go. Who knows how many years it will be before state reapportionment formulae which determine representation in Congress and the state legislatures recognize these current facts of our national life?

The second milestone which was passed with hardly a ripple was during the forties. It was then that the population residing in metropolitan districts exceeded the balance of the population of the continental United States. A majority of the nation's people dwelt in or around larger urban centers.

The third milestone occurred during the decade of the fifties. The central cities of the larger metropolitan regions began to lose population for the first time. Between 1950 and 1960, ten of the fifteen largest central cities in the nation lost population. By comparison, between 1940 and 1950, all of the largest fifteen cities had gained population.

The fourth milestone—which may well be the most significant event of all—is upon us. Probably this coming year the total metropolitan population residing outside of central cities will exceed the total population in the central cities. The implications of this development will be enormous.

Heretofore, suburban resistance to active forms of metropolitan co-operation has been generated out of fear of subservience to the central city. As long as the central cities had a substantial "majority interest" in the metropolitan area, the major economic, transportation, and other planning decisions were made there. The suburban influence through small village or town boards and weak county governments did little more than resist and act negatively. Fractured into hundreds, even thousands, of small decision-making units, the suburban areas did not organize to act positively on major metropolitan issues. The suburban areas are now to inherit the "majority" interest. What will they make of it? While these patterns of fragmented decision making can be continued, the results in terms of the evolving metropolitan regions will be tragic. Too many issues in economic development, transportation, urban renewal, water supply, water pollution, air pollution, recreation, and open space facing the nation's metropolitan regions require affirmative decisions based on a common destiny.

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* I am grateful to my colleagues, Marvin Roth and Ruth Miller, for the many valuable suggestions they made in reviewing an earlier draft of my manuscript.

Dick Netzer, of the Regional Plan Association, estimates that the total investment need in the New York Metropolitan Region between 1960 and 1985 will be 50 billion dollars for transportation, gas and electricity, communications, water and sewerage needs, recreation, education and other public and social services. He estimates the capital requirements for housing at 75 billion dollars, and for industrial and commercial plants at 40 billion more.

The public and private decisions underlying these expenditures will require a sure knowledge of regional trends. We shall also want to know how, with these expenditures, we can shape the region into a more productive, culturally stimulating, and desirable place to live. The population of the suburbs cannot avoid being affected by the momentous changes. They cannot shirk their responsibility for sharing in the making of constructive metropolitan decisions. The veto is not a creative tool in intergovernmental relations.

Fortunately, the suburbs are beginning to participate more constructively in metropolitan affairs. Suburban political leaders who, ten years ago, shied away from co-operative activity with central city public officials are now talking openly and continuously about greater regional co-operation.

Until substantial numbers of people, businesses, local governments in metropolitan areas see certain common elements in their destiny and are prepared to organize accordingly, data gathering and analysis will be sporadic, unsystematic, and incomplete.

Before outlining an organizational framework for metropolitan statistical and research activity, it will be illuminating to examine the organization of responsibilities for research and statistical operations generally.

Private funds have supported large-scale economic studies and have been invested to sustain research committees on a continuing basis. Grants to universities, major research institutions, and foundations have even facilitated the development of basic research in many categories. Research within individual establishments is supported by business when it is directly related to the policy or management problems of the firm. However, the business community rarely underwrites the compilation of basic data or statistical stock-piling activities.

Government has become the prime mover in large-scale statistical activity. This has come about for four reasons:

1. Only government has the legal powers to overcome the normal inhibitions of individuals and firms to disclosing information.
2. Private business cannot marshal on a sustained and voluntary basis the financial resources to carry out massive statistical operations. In fact, the collection of certain types of data, if organized by business associations, might subject them to antitrust charges.
3. A large amount of data collected by government agencies flows from a wide variety of administrative and regulatory activities. Government can, as it were, dip into a great reservoir of information.
4. Certain statistical or research activities are vital for policy making on matters recognized as affecting the general welfare of the nation.

The private interest in statistical information and research is more limited and parochial and less capable of assuming responsibility for the large-scale collection of basic data.

The public interest is broad, so broad that the field for statistical information is infinite. As a practical matter, careful selectivity must be exercised in screening requests for information.

Utility more than interest has therefore become a major criterion. Substantial programs of statistical collection and economic research on a continuing basis are not possible without the financial support of the executives in central decision-making positions. By and large, governmental, as well as business, executives are interested in research to the extent that it will clarify the particular policy or management questions which are central to their existence.

Where the data and research can be related to the decision-making process, there is a high probability that the financing for the statistical and research operations will be forthcoming. The cost of these operations is then directly related to the cost of doing business, even when the business is governmental. Basic research is not excluded from this calculation. Expenditures for basic research may be regarded as charges against development costs.

The failure to relate statistical and research activities to the questions which are relevant to policy-makers accounts, in my opinion, for the failure to float many proposals for comprehensive statistical and research activity. It may well be that the policy-makers are dealing with the wrong questions. If that is the case, then the agenda of policy questions must be changed. It is unrealistic, however, to expect acceptance by top management of comprehensive statistical services to deal with the questions they do not regard as particularly important.

The crucial necessity to involve top governmental policy-makers is evident in the New York Metropolitan Region. Four major efforts in the last fifteen years have been made to develop some form of permanent regional statistical bureau or urban research institute. All failed because the top governmental leadership was not involved.

1. An Institute for Urban Land Use and Housing Studies was organized at Columbia University in 1948 and was disbanded in 1956. Much significant research was carried out by an excellent staff. Its inability to raise funds reflects in part on its difficulty in attracting the interest of public and private policy-makers who control the flow of research funds.

2. A metropolitan statistics committee of the New York Chapter of the American Statistical Association tried for over ten years without success to develop a center for regional statistics. This effort failed primarily because its proposal was not related to the needs of executives concerned with the meat of metropolitan activity. Its appeal was too narrow.

3. The Regional Plan Association attempted for several years, beginning in 1955, to raise funds to organize a Bureau of Regional Statistics. The proposed bureau would have provided a wide variety of population, economic, housing, and land use data on a continuing basis. The Association sought to finance the services by obtaining sponsors to subscribe to the bureau and to sell information. The necessary support was never obtained. As pointed out earlier, it is difficult, if not impossible, to support statistical stock-piling operations by private contributions.

4. Several years ago, the Bureau of Applied Social Research at Columbia University developed a plan for a center for research on Greater New York. The proposed center would have: (*a*) maintained an inventory of metropolitan data; (*b*) surveyed research needs; (*c*) provided a research clearing house; (*d*) initiated basic research work; (*e*) provided a research advisory service; and (*f*) served as a professional training center. No clear financing plan was developed, nor was top-level metropolitan leadership involved in support of the proposal. Nothing came of it.

Continuous financing for these projects could not be assured without the involvement of the top-level metropolitan leadership. I do not wish to minimize the contribution of these groups. The Regional Plan Association and the Institute for Urban Land Use and Housing Studies have made substantial contributions toward the crystallization of the major metropolitan issues.

Partly through these efforts and partly by the force of events since World War II, we are on the threshold of significant actions affecting the organization of metropolitan regional activity in New York and elsewhere. The opportunities for organizing statistical and research activities on a metropolitan basis are near at hand. The accelerated growth of the suburban areas is generating a climate of co-operation. The realization that many area-wide problems can be dealt with only in concert is setting the stage for area-wide research and analysis activities on a continuing basis.

Only as a governmental framework emerges to deal with metropolitan problems will broad and comprehensive statistical activity and research become possible.

Let us now examine the elements pertinent to the organization of metropolitan statistical and research activity.

Financing statistical activity and urban research on problems of the metropolitan area is an appropriate and essential responsibility of local and county government. Without such financing, the type of regional economic studies needed on a current basis to appraise the state of the regional economy would not be possible. This financing, specifically for research and statistical development, could be based on a modest, per capita contribution.

The federal government could stimulate regional statistical research activity in two ways: (*a*) by providing, as Perloff suggests, flow accounts and projections and (*b*) by matching grants. The state governments with greater financial resources than the localities should provide matching grants. Relatively modest local investments in regional statistical and research activities would thus have a substantial yield.

The disbursal of research funds should be centered within the governmental framework. There are several good reasons for this, though some will have qualms. First, since public funds are involved, the arrangement of priorities must in the final analysis be settled by government. Undoubtedly there should be consultation with various levels of government, business, labor, and voluntary groups and with professional interests. Second, since governmental actions of considerable magnitude will be influenced by research findings, it is inescapable that government retain a vital role in the research process.

This disbursement function should be centered in regional intergovernmental councils where they exist. Regional councils with general responsibility are more likely to provide effective stewardship for the research function than will special purpose districts or authorities.

An effective disbursement process will require the establishment of a small staff of the highest professional competence and integrity. The directors of economic and planning research of the larger governmental units, voluntary and business organizations, and professional societies should be brought together in a technical advisory committee. The political, business, and civic leaders should be involved in this process through membership on a general advisory committee. Without such a committee, the research function will fail of necessary support, and the essential feedbacks between decision making and research will be lacking.

A distinction would be drawn between the disbursement function and the research and statistical functions. Though these two general functions could be combined, there is much to be said for not encumbering a central staff agency with responsibility for actually organizing all of the needed research and statistical activity.

The essential statistical and research activities include: statistical standard setting; regional status reporting on an annual basis; systems of regional accounts; special economic studies—some basic and some of a topical character; and special surveys.

Many of the research and statistical activities can be distributed on a contract basis among universities, research institutes, and business or voluntary associations.

The total intellectual resources in the community are enriched by involving an array of community institutions. The decentralization of research activities will also provide broader opportunities for developing new insights and fresh approaches. Furthermore, by enhancing confidence in research results, support for governmental actions is broadened.

The general arrangements proposed here are no blueprint, for this is not possible except within the context of a particular region and its set of institutions.

I have stressed the following: (1) The force of events is leading to some form of metropolitan governmental organization—such as regional intergovernmental councils—to deal with problems that can be dealt with only in concert. (2) The development of metropolitan statistical and research activities on a broad and comprehensive scale is possible only within the framework of general governmental organization at the metropolitan level. (3) Private sources alone cannot finance the research and statistical activities needed in metropolitan areas. (4) While regional intergovernmental councils must finance and set the

DISCUSSION

Meredith B. Givens: Somewhat slowly and tentatively the concept of systematic economic accounts as a basis for economic stock-taking, analysis, and policy making is beginning to develop at regional levels. At the national level the method of national accounts has evolved naturally to meet the needs of macroeconomic analysis and has been implemented by central government action in the co-ordination and systematization of statistical programs to produce the needed data. The commitment to comprehensive national accounts and the production of the required statistics has been forced by statutory mandate which requires periodic reporting on the state of the national economy. The application of this method at regional levels, however—and especially the development of the needed data—must overcome special difficulties.

The potentialities of a broad and integrated program for the development of regional accounts to be sponsored by the federal government have been described at this meeting and in other settings by Harvey Perloff. Professor Hirsch has outlined for us a set of interrelationships among external and internal forces, public and private, which condition, impinge upon, and in various ways determine the health and well-being of a region. He has also suggested leading dimensions of regional well-being which require quantification in considerable detail, and he proposes a unified information system which would be related principally to physical location (streets and real property) on the one hand and to the characteristics and activities of persons on the other, under a scheme to be prepared for electronic processing on a state-wide, interstate, or national basis. Henry Cohen recognizes the wider horizons introduced by the new methods of data processing. He stresses, however, the serious problems of data development and their dependence on the institutional framework.

It is scarcely arguable, I presume, that the final usefulness of analytical models is dependent upon the availability and adequacy of the basic data which can be fed into them. Cohen's paper directs attention to the general failure, thus far, of regional and local efforts to initiate the building of data resources adequate for fundamental regional analysis. It is to this aspect of our subject that I shall direct my brief remarks.

First, I would like to review some of the obstacles which retard regional statistical development and second, offer further comment on the lines of approach which I believe are prerequisite to the development of the data base to support research, planning, policy determination, and administrative action in a metropolitan urban region.

I agree emphatically with Henry Cohen that definitive progress toward the goals we are discussing is unlikely if not impossible without organization for regional planning and action on a more comprehensive basis than exists at present. True, there is a breakthrough in public awareness, but it is a limited breakthrough; there is still a virtually complete lack of co-ordinated decision making in urban regions; in fact, the larger and more complex the metropolitan area, the more tenuous and splintered the decision-making base in dealing with region-wide problems is likely to be. Whenever public awareness reaches the point of insistence on regional planning and administration of strategically important region-wide functions, the required support for great expansion of fact-finding and analysis seems certain to emerge.

I do not believe, however, that the needed informational resources will appear solely as a result of central supraregional statistical planning. Much nourishment for regional analysis can and should come from the upper levels of central government. A substantial argument for the creation of a federal Department of Urban Affairs is the need for stimulus, guidance, and co-ordination of an expanded flow of information for regional analysis. This function will be most effectively performed when it is associated with grants-in-aid or with programs and financing devices which carry mandatory reporting requirements in their trail. In the foreseeable future such programs from the center are likely to be selective and specialized, and I presume it will not be argued that they will fully cover the broad range of data essential for area and local research programs.

Regional data programs will be costly. They must reflect local priorities, and in specific settings they must provide for direct dealing with local agencies and with the respondent population in tapping locally available sources of information to supplement and amplify a national reporting program.

Regional statistical development must cope with the existing fragmentation of administration and the dependent data sources. This fragmentation is reflected in the prevailing unawareness of the importance of precision and comparability in definitions and classification procedures in the development of data—in the reporting of administration activities and measurement of performance on the part of local and regional agencies. Definite responsibilities for statistical standards must be assumed at regional levels for regional purposes, subject of course to the requirements of national reporting programs in the fields which they cover.

Study of the problems of urban regions quickly runs into statistical wastelands. Illustrations are not hard to find. In the case of urban mass transportation, for example, there is virtually no effort anywhere to assemble an integrated quantitative overview of the movement and circulation of persons and commodities. In examining the workings of the urban labor market, it is difficult to break out needed local data on the sources, physical movements, personal and family characteristics, occupational composition, and compensation of the labor force. The interrelationships of fragmented welfare programs are difficult to trace as they affect the total economic and social position of families and households. Many difficulties, at least in theory, can be overcome by the application of a more or less atomistic scheme of location coding, when mass data are available for such treatment. The costs and cumbersomeness of elaborate coding systems become impressive, however, when they are to be applied to decentralized sources not subject to central control.

In many regions and localities a good deal of work has been done in the assembly and publication of regional statistical data. In the main, these efforts have been confined to the collation and dissemination of miscellaneous series gleaned from a variety of sources with insufficient analytical or administrative focus. Despite their superficialities, these efforts are a developmental stage and serve interim purposes in spreading awareness of regional statistical sources and needs.

Recently the volume and scale of research in metropolitan urban problems has expanded impressively. One evident characteristic of most of this work, however, is the underemphasis on the development of the data base for research. Projects with fixed budgets and terminal dates must "make do" with the materials at hand, since the roundabout process of statistical development is too slow for compressed research time tables. It is a familiar fact that successions of research projects in a given field may leave each new investigator to confront the same handicaps of insufficient and faulty data. Yet a research agency which is not moored in some way to decision making finds it unrewarding to tackle in any detail the problems of statistical development when there is no existing organization to grapple with them on a continuing basis.

Even in this statistical age too few key persons and agencies are adequately aware that the tasks of data development are arduous, time-consuming, and expensive. This myopia is one of the reasons for the failure of the "data bank" type of project to which reference has been made. A data bank must be a multipurpose project, with many users. Conventional sources of funds, public or private, will ration their support with caution in allocating funds for costly statistical development with the scope and depth required for a fundamental program of regional analysis.

The connection between proposals for data development and fruitful end-product research is often tenuous or lacking. Data programs should be visibly research-connected and tied in with practical decision making.

With reference to suggested solutions, it is important that the emerging administrative organization of metropolitan regions shall be equipped with research facilities. Equally important, provision should be made for effective intercommunication among the agencies and individuals engaged in research and utilizing research results which relate to the region. A data development program should serve the combined high-priority informational needs of significant action-connected research activities in the area. Regional research organization under public auspices can advance these objectives by providing within its structure for wide functional participation from many agencies in an action-connected research program. Such organization will greatly facilitate educational effort among the regional constituency which will be required if understanding support for a basic data program is to be built.

FREDERICK T. MOORE: George Bernard Shaw once said that he searched with the utmost care for the right thing to say and then said it with the utmost levity. I can do no better than to emulate him, on the theory, to turn the phrase around, that levity is the soul of wit.

Perloff and Hirsch are among the pioneers in the field of regional and urban economics. They have given us two papers that draw on their extensive experience to look retrospectively at how far we have come and, more importantly, to look prospectively at the distance we have still to go before we shall have an adequate basis in information to pursue our studies in the field. The two papers also offer a contrast in temperament on the subject. Hirsch is a positivist; he trumpets our needs in no uncertain terms. The challenge is clear; we ignore him at our peril. Perloff is a pragmatist and has not thrown down the gauntlet quite so vigorously. My sympathies are with Hirsch, but wisdom born of frustration says that Perloff is apt to be more nearly right as to how much we can accomplish in the near future.

Both papers have the same aim—to increase the extent and type of information that is collected on urban and regional affairs—but Hirsch has specific suggestions for accommodating the information in a single framework, whereas Perloff apparently does not. Hirsch describes a regional interaction model as a "generalized decision-making model" comprised of four boxes. These boxes correspond in a rough way to the four quadrants of an input-output flow table though he has subdivided one of the quadrants. He has also pointed to the need for an integrated three-level flow system of national, regional, and intraregional accounts. This is a necessary first step but it is not sufficient as a total framework. In urban and regional analyses, many types of relationships or transactions are needed for various analyses. Transactions of spending and saving, wealth gathering and transfer, and implicit nonmonetary transfers may be required for specific purposes. They probably can be included in some generalized social accounting system but not in a standard input-output table that emphasizes the production relationships. Like the diet of cannibals, the input-output table is tasty but runs heavily to one type of item. These items are perhaps the most significant; I think myself that they are, but it would be a disservice to imagine that that is all we need as a framework on which to hang the statistics.

Moreover, it should be noted that Hirsch believes the information system "should provide easy and universal access to a virtually complete file of data," and has already identified 103 pieces of information to be collected on each person, plus 35 on street and roads, and 90 on real estate. On the person data alone, for a metropolitan area of ten million persons that is more than one billion bits of information—an amount to stagger the capacity of any computer. Even so, I would wager that this would not be enough data for all purposes but too much for most purposes. The situation is aptly characterized by Thurber's comments on martinis: one is fine, two is too many, and three is not enough.

Perloff on the other hand suggests proceeding on four interrelated fronts: regional accounts, growth projections, aggregative impact analysis, and specific project analysis. I am persuaded that this heuristic and plural approach to the problems is the one to follow. It may or may not ultimately lead to a universal system of regional accounts.

I am further troubled by another point and that is the need for urban and regional accounts to be more delicately poised and accurate than are national accounts. In the latter we can afford to be more sloppy, for the errors in one place may cancel out those in another; we are dealing with larger aggregates of things. In urban and regional accounts the number of industries, firms per industry, types of transactions, etc. are usually scarcer, and the effects of changes in policy must be more carefully traced. If we can use a carving knife on the national accounts, we'll need a scalpel on the region, and that enormously complicates the task of data collection and use.

A final point, but a major one, that has been included almost as an afterthought in the papers is the question of the appropriate social welfare criteria to use in the model. The problem of criteria is always a troublesome one and it has received less than it due. Hirsch mentions five main dimensions of social welfare including net social benefits and amenities of life. Perloff raises the same issue in terms of equity; for example, prettifying an area by redevelopment shifts costs to slum dwellers. Neither author need have raised the issue at all, and I rather wish they hadn't. But now it's out in the open, it cannot be dismissed easily. Some measures of welfare we economists accept easily and correctly; e.g., a rise in per capita income. Others such as amenities and net social benefits are too nebulous to have an unequivocal meaning in the usual case. The proper criterion depends on the special problem under consideration. Trying to formulate general criteria and intimating that with a good social accounting framework we can help solve land use problems to the extent of recreation, parks, and beaches will not advance our common crusade. We simply cannot deliver the goods. Consider how poorly we have done in formulating criteria for the city of the future. The devil can quote scripture in favor of the core city, the annular city, or even for urban sprawl with each man a king on his own quarter acre. We have not been successful, and are unlikely to be so, in trying to encompass certain kinds of policy problems in our framework. There are dangers in overreaching and thus imperiling the really strong parts of the argument. For the most part, the social welfare function has been pursued in the same way sex has—in an unskilled but highly enthusiastic fashion.

In this season it is well to end on a note of faith and hope. The authors have pointed the way to a number of improvements in our knowledge of subnational accounts. It will take both faith and hope, plus a great deal of hard work, to advance the field a few steps along the way.

THE ROLE OF TRANSPORTATION IN ECONOMIC DEVELOPMENT

AIR TRANSPORT AND ECONOMIC DEVELOPMENT: SOME COMMENTS ON FOREIGN AID PROGRAMS

By HANS HEYMANN, JR.
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It may seem surprising to some that, in a session devoted to the "Role of Transportation in Economic Development," air transport should have been allotted any place at all on the program, to say nothing of being accorded first place. When viewed against the massive ton-miles carried by its earth-bound competitors, air transportation, with its modest capacity, hardly seems worthy of such recognition. Indeed, given the low-value, bulk-commodity character of the basic transport problem in underdeveloped countries, and given the present and prospective state of the art in airlift technology, it is probably safe to predict that air transportation will remain for many years to come a relatively minor element in the over-all transport balance of these countries.

Why then should any particular attention be paid to this admittedly subsidiary transport medium? Several good reasons come to mind.

First, air transportation has demonstrated a surprising ability to perform a significant transport role in underdeveloped areas, in spite of its relatively high costs, limited capacity, and basically long-haul character. In countries where internal distances are great, where producing and consuming centers are widely scattered, where terrain and climatic problems are exceptionally hostile, and where the flow of traffic is often too thin initially to justify heavy investments in road or rail systems—in such countries air transportation has shown itself capable of speeding up the development process with a relatively modest drain on precious capital resources.

Second, the U.S. enjoys today a position of technological and economic pre-eminence in the sphere of air transport. In a world eagerly looking for ways of using technical ingenuity and superior productivity to overcome economic backwardness, such an asset ought to be carefully nurtured.

Third, considerable foreign aid resources, private investments, and local efforts have been and continue to be devoted to building up air transport in the developing countries. It is important that these resources be wisely used and effectively geared to the over-all economic development task.

Fourth, because of its well-known spectacular and dramatic qualities, aviation appears to hold a special fascination for governments everywhere, but particularly for the ruling elite in less developed countries, where an aviation project is more likely to evoke sustained interest and enthusiasm than other more pedestrian pursuits. Since the success of a development project so often depends on the continued support and dedication of the developing country itself, this magnetic quality may give aviation something of an edge over its less glamorous transport competitors.

Finally, the proper role that aviation should play ought not to be assessed purely in a transportation context. It has a broader social and political function in breaking down the isolation that stems from inaccessibility. Aviation is also capable of performing a variety of non-transport "air work" functions that are remarkably effective in uncovering, protecting, and "beneficiating" a nation's natural resources. These functions could make a more significant economic development contribution than its more widely recognized transport functions.

For these and other reasons, some consideration of air transportation in this session may not be entirely out of order. I wish to describe first the general nature of the U.S. aviation involvement with underdeveloped countries, then to examine some of its consequences, and finally to consider a few of the special problems that the air transport function poses for the pursuit of economic development objectives.

Nature of U.S. Aviation Involvement

It is hardly surprising that, over the years, the aviation resources of the West should have been devoted largely to the establishment of rapid air communication among the advanced industrialized countries, while the development of air transport in the economically retarded parts of the world has received scant attention. The financially rewarding traffic generators for commercial aviation are, of course, the high-speed, long-range, nonstop air routes linking the developed parts of the world. Underdeveloped countries have occasionally been of interest to aviation as way stations or as trade-route crossroads, but they have not been significant as markets for modern aircraft or for air transport services.

Western air transport, nevertheless, has made some inroads into these areas. The global character of modern air communication made it inevitable that aviation would become involved with the less developed countries. The involvement came about under the impetus of three forces: (1) the international air carriers who found it profitable, if not essential, to promote the development of local feeder airlines to generate traffic for their global trunk routes; (2) the aircraft and equipment manufacturers who were eager to open up new markets for their aviation products; and (3) the Western governments which provided diplomatic and financial assistance to their respective airlines and manufacturers, in the conviction that the world-wide expansion of their flag carriage would enhance national prestige and serve broad economic and security interests. In combination, these factors led to the formation of a large number of airline affiliations and close commercial ties between Western flag carriers on the one hand (particularly U.S., British, French, Dutch, and Scandinavian) and local airlines throughout Asia, Africa, and Latin America on the other. In the U.S. case, the motivation for these relationships was essentially commercial. In order to make the long-haul international air routes profitable for U.S. carriers, local airlines had to be created to feed "fill-up traffic" into the intermediate stops en route; airfields, navigational facilities, and ground services had to be improved; and international aviation rules and procedures had to be standardized. Thus U.S. carriers vigorously promoted local airlines through equity participation or management assistance in such diverse countries as Greece, Turkey, Egypt, Ethiopia, Saudi Arabia, Jordan, Iran, Afghanistan, Thailand, the Philippines, and in many parts of Latin America. At the same time, the U.S. government provided extensive technical and financial assistance to local aviation infrastructures and strongly supported the United Nations program of technical aviation assistance through ICAO.

What is of particular concern to us here is the fact that, for the most part, this assistance and these relationships were aimed not at promoting economic development in the recipient countries but at furthering the cause of international aviation. The principal objective of our aviation assistance to other countries, as stated in the Federal Aviation Act of 1958, is "to encourage and foster the development of civil aeronautics and air commerce in the United States and abroad." The orientation of our aid, accordingly, has been more toward enhancing the aviation contribution of the less developed countries to the international air links than it has toward aiming aviation at their own domestic development. This fact is strikingly reflected in the nature and composition of our aviation assistance programs.

Over the years, considerable aviation aid has been extended to the developing countries through ICA (now reorganized under the name of Agency for International Development) and through our international lending institutions. Under ICA (now AID) sponsorship, the U.S. is engaged in some forty aviation projects spread over three dozen countries of Africa, Asia, and Latin America, amounting to about 15 million dollars per year. These projects run the whole gamut from airfield surveys in Cambodia to navigational training in Ceylon, from improvement of aeronautical ground facilities in Vietnam to air traffic control in British Guiana, from the modernization of a jet airfield in Liberia to the construction of an overhaul facility in Thailand. In addition, over the last three years alone, some 24 million dollars worth of Export-Import Bank credits have been extended to various underdeveloped countries for the purchase of U.S. aircraft and aviation equipment; and almost 50 million dollars worth of Development Loan Fund loans have been granted for the construction of jet age airports.

While it is not always possible to distinguish clearly among these aid projects as to whether they serve local aviation or international aviation purposes, there can be little doubt that the overwhelming bulk of these aid resources have been devoted to the international phases of aviation. For example, taking the Export-Import Bank and DLF loans alone, of the almost 75 million dollars worth of credits extended to underdeveloped countries for aviation in the last three years, all but about 2 million have gone to finance the sale of modern U.S. long-range aircraft and the construction or improvement of jet airfields, both clearly intended for the international traffic. In short, the U.S. involvement in the air transport activities of the underdeveloped countries has reflected our own interests and preoccupations rather than focusing the attention and energies of these countries on the more arduous realities of their internal transport problems. Our aid has tended to draw them into our environment but has not drawn us significantly into the task of transforming theirs. But this latter task has now become of urgent concern, and perhaps there is a case for devoting more of our efforts henceforth to the internal aviation needs and possibilities in these countries.

Underdevelopment and International Aviation

The benefits that international aviation have brought to the developing countries are, of course, considerable. It has forged links between them and the outside world that, by now, are generally efficient and well established. In the process, it has enlarged the horizons for tourism and has quickened commercial intercourse. The large expenditures that many of these countries have made on facilitating and improving their international air communications can often be justified entirely in terms of the resulting increase in their foreign exchange earnings, to say nothing of the indirect social and political benefits they yield.

But the preoccupation with international aviation also has been a negative force and a source of serious distraction in many of these countries. It has stimulated and fed the "showcase" psychology, the gadget worship that appears to be an almost universal phenomenon in the underdeveloped world. Our own devotion to improving and streamlining international air travel has struck an all-too responsive chord in the seemingly irresisitible compulsion of the developing countries to pursue illusions of grandeur and the trappings of national prestige. Being under pressure to give the appearance of dramatic progress, they tend to lavish attention on the monumental development of their capital cities. Mehrabad International Airport in Teheran, for example, has probably gobbled up, during the first half of the current Seven Year Plan, something like 80-90 per cent of the entire airport development budget of Iran. A palatial air terminal in the nation's capital, shiny jet aircraft bearing the national flag, these are the symbols of modernism, the tangible evidences of national achievement, for which no expense appears too great and to which modest practicality and economic sense are readily sacrificed.

One of the most deplorable manifestations of this special form of underdeveloped status-seeking is the proliferation of small national flag airlines that every newly independent country appears to feel called upon to create, with grossly inadequate technical resources and experience, but with a voracious appetite for engaging in long-range international air carriage. An almost grotesque example of this is the case of Ghana Airways, which came into being shortly after Ghana had gained its independence in 1958, and promptly plunged into a costly and confused expansion program designed to make the new airline into the dominant international carrier for all of independent Africa. Its route ambitions extended across the North and South Atlantic to the Americas and east as far as Japan and Australia. To make these airborne pipe-dreams come true, Ghana embarked on a reckless buying spree, placing orders for sizable fleets of turbine aircraft in the Soviet Union, Britain, and the U.S., without much apparent concern for the ability of its treasury to meet such financial commitments and in the full knowledge that its proposed air venture could not help but incur sizable annual deficits. Ghana's unrealistic ambitions will no doubt be trimmed down to size before long, but it is somewhat distressing to realize that, far from discouraging such resource misallocation, the actions of the West often tend to foster it, sometimes unconsciously by its example, more often consciously by its export promotion and aid policies.

But not all cases are as clear cut as that of Ghana. Some emerging countries have, over the years, carved out a small but effective role for themselves in international air transport and have derived real economic benefits from it. But even such countries must ask themselves how far they should go in this role. Ethiopia, for example, began some fifteen years ago to develop its national airline with the help of invaluable operational and management services being provided by a major U.S. carrier. The arrangement proved most successful. Domestically, an air route system was created that has opened up Ethiopia's hinterland and has provided an indispensable cargo and passenger airlift capacity for this extremely mountainous country. Internationally, efficient access for Ethiopia to the outside world was created by opening up a direct route to Western Europe. In recent years, however, this European route has increasingly become the tail that wags the dog. Since the Ethiopian airline has had a virtual monopoly on much of this route, the international operation has turned out quite profitable for Ethiopia, while the domestic routes, because of their developmental nature, have only barely covered their cash costs. Because of this, as well as the usual prestige reasons, Ethiopia's attention began to shift more and more toward the international operation, to the neglect of its domestic transport development. As was bound to happen, jet transports are now on order with Export-Import Bank financing, and a DLF credit has been extended to develop the enlarged airports needed to handle them.

The question here is not so much whether these expenditures are economically justifiable. Perhaps they are. The question is, how will these activities affect Ethiopia's technical independence and self-reliance? Until recently, Ethiopia had made much progress toward transforming its airline into a completely native operation. Not only flight and ground crews but even managerial positions were increasingly being filled by Ethiopians, and it was possible to look forward to the gradual phasing-out of the U.S. airline's management role. But now, with Ethiopia's plunge into the jet age, the hope of self-sufficiency has been dealt a serious blow. The task of operating the complex new equipment efficiently and of filling a much expanded volume of available seat-miles in an increasingly glutted market will impose the most stringent demands on the airline's management skills and will cause further neglect of the domestic sector; the transition to jets will require more specialized assistance from the U.S.; and the goal of independence of Western tutelage will surely be put off into the distant and indefinite future.

Is there an alternative for the developing countries? It is easy and, of course, logical to recommend that they should forego this costly and unpromising involvement in international air transport and should concentrate instead on their internal and nearby regional transportation needs. But given the intensity of the prestige compulsion throughout the underdeveloped world, such urgings by the West are likely to go unheeded.

One interesting solution that is beginning to catch on here and there is for small national airlines to enter into a new type of pooling or charter agreement with a large international carrier, under which the large carrier takes over and operates all of the countries' international routes, using his own modern equipment, but displaying the markings of the small airline whose routes are being served. Revenues, of course, are shared. Such arrangements appear to be working well for a number of countries, such as Cyprus and Thailand, who are relieved of the managerial and financial burdens of an international operation and who find that the superior resources of the large carrier and the integration of their route structure with his has improved the prospects for an efficient and profitable service while at the same time fully salving their national pride.

Another way of weaning away the attention of the developing countries from international aviation and focusing it on their domestic transport possibilities would be to try, through our aviation assistance, to make their internal air transport development more dramatic and appealing. Unfortunately, the attempt to stress the dramatic and spectacular in aviation is beset with traps, since it tends to raise exaggerated expectations that often end in disillusionment. Afghanistan offers an instructive example of the pitfalls of such an attempt to be spectacular.

Air Transportation and the Spectacular

When, in 1955, the Soviet Union made its first dramatic 100 million dollar credit offer to Afghanistan, a quick and equally dramatic U.S. countermove appeared to be called for. Afghanistan, being landlocked, treacherously mountainous, and totally devoid of railroads, is an almost classic case of a country that needs air transportation. Thus it seemed entirely logical for the U.S. to propose an ambitious scheme, aimed at propelling Afghanistan in short order from the era of the camel caravan into the jet age. A 15 million dollar aid agreement was signed in June, 1956, under which Afghanistan was promised a full-blown international jet airport at Kandahar, a handful of smaller domestic airports, a complete airways communication and navigation system, a functioning national airline of their own, equipped with modern aircraft—all complete with trained personnel, organization, depots and ancillaries. And all this was to be put in place within three years, with the help of a technical and airline management assistance team furnished by a major U.S. carrier.

How dramatic were the results? For the first nine months after the signing of the agreement, nothing at all happened. This time was simply consumed in organizing the project and recruiting personnel.

When the first American technicians arrived in Afghanistan in April, 1957, they encountered the familiar phenomenon of a total absence of the local resources and human skills necessary to conduct and support such a complex undertaking. Remarkable progress was made, nevertheless, in the remaining two years, despite the difficulties, but the achievements necessarily fell far short of the original glowing promise. Aviation development in an underdeveloped country simply cannot be a "quick impact" activity. Airplanes and airfields can be furnished relatively quickly, but these represent only the foliage of the tree. The trunk and roots of aviation—the aeronautical training, the navigational and meteorological skills, the concepts, the rules and procedures—must be nursed along slowly and carefully over many years. This fact soon became apparent in Afghanistan and the whole nature of the project gradually changed from a hasty "spectacular" to a much more deliberate, systematic, co-operative venture between the U.S. and the Afghan government. The objectives were gradually redefined, the time horizon was extended from three years to six years, and the price tag went up from 15 to a more realistic 50 million dollars. The earlier disappointment over the failure to realize the original promises is beginning to fade, and in time, the Afghans will be able to point with satisfaction to the transformation that will have been wrought in their air transport position. The results, however, will have been achieved, not with drama and fanfare, but through patience, persistence and slow but steady forward movement.

A Development Role for Aviation?

The burden of my argument so far has been largely negative and cautionary—against the glossy, the monumental and the overly ambitious. Underlying my argument, however, is a belief that there is also a positive, constructive role for aviation in the development process—a role that has perhaps not so far been fully realized.

The place that air transport has made for itself within the underdeveloped countries is a spotty one. In a few areas it has made remarkable inroads, mostly where it discovered or took vigorous advantage of "special situations." In Colombia, for example, the striking success of air transport is easily explained by the dispersion of economic activity among a half-dozen major urban centers, separated from one another by enormous terrain obstacles that render other forms of transport practically unacceptable; in Afghanistan, the lively air traffic in karakul skins from Kabul to Beirut is made possible because of the high value-to-weight ratio of these popular hides; in the Chad and the Cameroons, the large-scale airlift of meat can take place because of the existence of lush livestock-raising areas deep in the northern interior, side by side with the critical protein food needs of the southern urban centers; and in Ethiopia the rapid air traffic growth occurred largely because the airplane could reach previously inaccessible areas and could lift out a wild-growing coffee crop which would not otherwise have been harvested. The list of such success stories, however, is not a very long one. In most of the emerging countries, what air transportation there is does not appear to play a particularly lively role in the development process, and I wonder whether this is altogether due to the absence of the right combination of circumstances and possibilities that would favor air transport, or whether there might not also be a lack of vigor in searching for such possibilities or developing them.

When we look at the air transport enterprises that have been set up in many of these countries, we find that they have a strong tendency to "mirror image" the airline outlook and practices of the West. Their standard organizational format is that of a profit-making commercial venture whose aim is to run a sound, conservative, feeder-type operation along the lines of a U.S. local service carrier. They operate conventionally along regular routes, but only where the immediate traffic potential warrants it. As in the West, their main concern tends to be with the passenger traffic, with break-even load factors and with on-time performance. And also as in the West, they rarely operate at a profit, but they try to.

This sort of approach hardly seems well designed to exploit the full possibilities of aviation in the developing countries. For it is unlikely that a conventional airline would have the resources or could afford the financial risks of experimenting vigorously with new routes that might be pioneered, isolated areas that might be opened up, and contacts with civilization that might be established where such activity might never pay for itself directly but would merely create important external economies for the nation. But in the absence of such experimentation, air transportation remains essentially a passive element, merely responding to the market rather than actively creating one, and it gets caught up in the vicious cycle of underdevelopment: there is no market because of underdevelopment; development is unprofitable because there is no market.

To what extent can we look to air transportation to "develop" a market? There is, of course, no reason to suppose that air transportation by itself is capable of creating any sort of economy-wide dynamism, that it could form a nucleus around which other productive activities would develop, or that it could generate, by its mere presence, a range of new and tradition-breaking economic activities. Nor am I suggesting that in an underdeveloped country vigorous productive activity can suddenly be created merely by flying aircraft into previously isolated regions. It would surely make little sense to open routes more or less indiscriminately into remote villages, in the hope that, by some magic, their economic autonomy would break down and market relations with the economic system of the nation would begin to form. The mere existence of a transportation route does not mean that it will be used. The problem of incorporating remote villages or areas into the nation is not solved simply by establishing contact, however valuable such contact might be to the government from a "political communication" point of view; but to be fruitful, the contact must involve also in some way the creation of needs or the fulfillment of demands which the area is not able to meet autonomously. To make the contact meaningful, the new transportation link must be closely associated with some new economic activity that the nation might inaugurate or useful social services that the government might render.

Air transportation does seem to be rather well designed to serve this sort of dual role of transport link *cum* socially useful function. Unlike other forms of transport, it does not require large initial outlays on fixed installations, like a roadbed, to open a route. Primitive airstrips can be quickly leveled almost anywhere. The size of the unit can be selected from a highly varied menu of aircraft types, ranging from modest grasshopper to full-fledged transport, to fit any particular task. With this kind of flexibility, air transportation could make its contacts with remote areas meaningful, especially if it associates such contact with important developmental activities that directly affect the life and work of the population. Activities like crop-dusting and insect-control for agriculture, veterinary services for livestock, medical and educational services for people, the mapping and surveying of local resources—these are the sorts of activities that can be carried out from the air or promoted through air transport and that would constitute the kind of radical break with the established routine that is an essential ingredient of social change.

This role of air transport does not now receive much attention in our aviation assistance projects nor does it loom large in local air carrier philosophy. By concentrating mainly on conventional airline objectives, the development potentialities that may be inherent in the aviation instrument have not been fully brought out. How effective air transport might be in the role of "market creator" is not clear, because no really vigorous effort has been made to put it to the test. But it would seem to be worth a try. The costs of "bush flying" are not high, and the penalties for failure not overly severe.

PLANNING FOR TRANSPORT INVESTMENT IN THE DEVELOPMENT OF IRAN

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Introduction

It appears to be useful to train the attention of the economic development theorists as well as the practitioner on some recent experience with transport planning problems in Iran, since it is believed that here we found recurrent and general problems of significant magnitude which must be accounted for if theoretical or analytical approaches are to be useful tools in transport development. It is not suggested that from this, and perhaps similar reviews, a general transport theory should or will evolve; yet the gap between the analytical work and the recurrent institutional and cultural factors can well be narrowed. The least which a review of transport planning problems might achieve is to give the economist an opportunity to commiserate with his confederates in facing their mutual difficulties and to suggest to others various areas of transport economics and planning which might well deserve their attention and research.

There is ample justification, indeed a crying need, for a more intensive examination of the transport and communication sector of the economy as a unique and integrated area of investment decision. While the transport and communication infrastructure necessarily exists as a means to facilitate the economic growth of industry, agriculture, and commerce, it has distinct and compelling problems which should be approached as an integrated field of analysis in itself. Size of investment alone might suggest this. Tinbergen, in "Design for Development," refers to a fairly constant proportion of 20 to 25 per cent of total investment in developing economies; recent national plans of some thirteen ECAFE countries indicate a range from 16 to 34 per cent; in Iran approximately one-third of public investment was allocated to this sector. There can be no "golden rule" for resource allocation to transport and communication. This is largely a complex function of the country's land mass and formation, the social and economic organization and location of resources, the stage of industrialization, previous investment, dependency on foreign trade, and other factors. However, we are aware that in developing economies, with a shift of employment from agriculture to industry and to the trade and service sectors, we find a proportionately greater requirement for transport and communication than in the more developed or mature economies where transport requirements increase at a lower rate and have a more directly proportionate relationship with the growth of the gross national product.

While one need not plead a case for special and more analytical work in transport and communication problems, various distinctive features of this sector which differ in kind as well as degree from other sectors of the economy need be recognized. Of course, the public nature of investment in this basic infrastructure is immediately apparent to the planning group in developing countries, since the private sector will not or cannot take the initiative as in agriculture or industry. Furthermore, in those instances where private investment in transport and communication is likely to occur (e.g., telecommunications), unless carefully conceived regulatory contraints and standards are established, the forthcoming hodgepodge of ineffective or misused facilities is likely to result in a woeful waste of resources.

Planning Perspective in Relation to Other Sectors

More significant than the size, shape, or public nature of the transport and communication development investment in distinguishing it from other sectors is its dual nature in playing both a "passive" and a "dynamic" role in development, as well as the time perspective required for transport planning. These two qualities together raise severe economic planning problems. On the one hand, the passive role of transport development is, of course, to meet the current and immediately foreseeable demands of agriculture, industry, and trade (responding to the "squeak of the wheel") while the dynamic role is to facilitate the exploitation of unutilized resources through the construction of ports, highways, pipelines, etc., for further industrial and agricultural development. However, in addition, the time perspective of planning for these transport and communication facilities is significantly longer range and yet needs to be far more precise than the vision of the plans as they are developed for the agricultural or the industrial sectors. The transport and communication planner keeps finding himself well ahead of the sector planning for which his facilities are designed to serve. When planning roads, about a twenty-year perspective must be maintained; for railroad equipment ten to fifteen years is necessary; and port installations must be thought of in terms of about twenty years with some of the wet-works of outer moles anticipated to last forty years. All these transport and communication facilities cannot be abstract concepts of development; they must be specific roads, specific railroads, specific ports, etc., in specific locations designed to handle specific levels and types of trade between specific points.

Seldom is the long-range planning of industry or agriculture spelled out in a manner which the transport economist can use in this time perspective. Long-range industrial sector planning may well foresee and provide for a fairly specific list of industries to be developed, but without the detail indicating location or perhaps timing. Often industrial plans, in a private enterprise context, have major emphasis placed on use of credit facilities to stimulate private initiative; thus contributing to the vagueness of time and location of new industrial growth. Similarly, long-range agricultural planning will seldom be more specific than indicating goals of production by foodstuff types and program means of increasing production through seed, fertilizer, mechanization, water, and credit programs. These programs by their nature are not and cannot be readily translated, even in the short run, into transport requirements to meet the transport economist's planning needs, and certainly not in the longer run of ten or twenty years or more.

In a developing economy there are, of course, many obvious transport and communication facilities which are at all times currently and compellingly required, but even they must be planned and designed with a time vision far exceeding the specific demands known or being forecast by the plans of industry and agriculture. In a developed or semideveloped economy the major transport requirements for the immediately foreseeable future can be forecast in terms of total ton-kilometers or even volume commodity specifications from ports or producing areas to markets and consumption centers. But seldom in an undeveloped economy is the transport economist given these requirements with which to work.

Complicating this difficulty further is the paradox that, while transport and communication facilities generally have an engineering depreciable life of many years, the economic obsolescence factor in various transport media is relatively high. Heavier trucks and diesel engines make road and rail beds obsolete; larger dead-weight tonnage ships make ports inadequate; and higher specification international air equipment and safety standards rapidly make the *ex ante* forsightedness on airport designs of yesterday appear, *ex post,* to be nearsighted.

Faced with this basic dilemma of having to plan quite specifically well beyond the terms of reference with which industry and agriculture plan and yet having to plan for the needs of the industrial and agricultural sectors, the transport economist must develop his own projections and design the country's long-range transport and communication facilities in terms of basic economic, geographic, demographic, and political factors. Of course, the current and projected demands of the various sectors for transport must be extended as far as the data and thinking allows, but in addition, the transport economist must work at quite another level of abstraction. From population location and projection studies, from analyses of current and probable arable land and water resource development, from the pattern and timing of projected industrial development, from the mineral, power, and human resources and the plans for their exploitation and development—from these studies and plans the transport economist must attempt to block out the basic framework and timing of the transport infrastructure so it can play its proper roles, both passive and dynamic, in development, without a misdirection and waste in the various transport media which require such massive amounts of investments.

To develop tools for this type of approach, there are many areas in which useful work needs to be done. First and foremost, perhaps, is the systematic collection of pertinent data in the developing countries, without which further analysis is estopped. Correlating, both historically and comparatively, levels of gross transport requirements with levels of income grouped by stages of economic development would be most useful. Extension of such work by developing the transport requirements into cube and density factors, if not also for basic commodities, would be most helpful. Companion work, but analysis which has its own need, is the translation of the rough orders of transport magnitudes into selections of, or at least the natural biases for, development of alternative media of transport facility best suited for the length of haul, type of commodity movement, speed, geographic constraints, administrative abilities, etc., so an integrated road, rail, pipeline, port, airport, and telecommunication system can more readily be designed. In this area much thoughtful work in developing the relative coefficients for transport media in terms of commodities, values, weights, cubes, and lengths of haul is badly needed for more effective transport investment planning in Iran and other developing countries.

Cost-Benefit Difficulties

Making the transport economist's task even more exacting is that he also has serious and unique difficulties both with the cost and with the benefit sides of his equations when analyzing the relative merits of transport investment.

On the cost side, great difficulty comes from the "lumpiness" of investment decisions, since the cost functions are not continuous. Once a railroad expansion investment is indicated, the whole expansion must be accomplished for the major benefits to accrue; a road must be built between two points before it has much utility; an airport to handle major international traffic must be built to accommodate the largest international jet aircraft or not at all, since half a runway or a runway with the bearing capacity of only one-half sufficiency would obviously be a spectacular monument to half an idea. Complementary or supplementary investment requirements also increase the "lumpiness" of decision with many transport facility projects. This is particularly true in regard to dynamic transport investments. For example, in southeast Iran a new deep-water port near Bandar Abbas has been designed costing approximately 20 million dollars. For this port to be utilized at a level justifying the port investment, a road system connecting the port with the hinterland will simultaneously have to be constructed at a cost of at least again the order of magnitude of the port itself.

Transport project costs are not only lumpy and large but they also often have the tantalizing variable of fairly wide ranges of costs with relatively small changes in specifications. This makes the cost-benefit analyses difficult, when the change of specification of a road from a weight-bearing strength of 10 to 13 ton axle load can increase the construction costs about 40 per cent; or dredging a harbor an extra meter from 9 to 10 meter depth to accommodate current or anticipated ships at most tides might well increase harbor costs 15 to 20 per cent. These specification issues often become the critical points of policy decision; yet they cannot clearly be analyzed quantitatively in terms of benefits. Furthermore, the crucial determining factor for a decision of this sort may well be a political one which cannot readily be given in advance. For example, in Iran the issue of bearing capacity specification for the roads was a function of whether the government had the desire, stability, and power to enforce a weight limitation and at what level it could be made effective.

While costs as a function of these types of decisions were found to range widely—far wider than one might have anticipated—the transport economist is also surprised to find other cost relationships quite set without much tolerance for choice or effect on costs with alternative decisions, technology, or substitution of inputs. The absolute, or almost absolute, lack of substitutability of labor for mechanical equipment for some major infrastructure construction operations (e.g., dredging of a port) and the high cost of labor input for other transport facility operation (e.g., earthmoving for road construction, or the crowning of a road) compared with mechanizing the operation, even with labor costs approaching zero, establish some real constraints on the modes of construction and the costs which much be accepted as given. The lack of economic substitutability of construction methods established a fairly constant range in Iran for many transport projects' costs (including foreign exchange requirements) once the specifications were determined. In this cost field as well as in specifications, it is believed that much useful work can and should be done in co-operation with the development engineer in defining the areas and ranges of substitutability of input factors for basic transport media construction; so that with certain ranges of input costs, the planning economist can know the alternatives which are available to him. Some of the rigidity and lack of substitutability which the engineer currently insists upon is primarily a function of applying techniques of a developed society to an underdeveloped one without critically re-examining the relative input values of such factors as skilled and unskilled labor, capital, spare parts, and maintenance in the underdeveloped country.

Wide cost ranges by specification and relatively set construction cost coefficients suggest another area where the economist should concentrate his planning efforts in co-operation with the engineer. This is in defining carefully the stage, phase, or level of development of a transport media to meet the prospective demand, but yet not to overinvest. For example, by projecting the type and level of traffic on road segments and comparing the costs and benefits per vehicle-mile with the relative costs of developing the roads to various levels or stages of construction, decisions on staged development can be made consistent with long-range future road development plans at a far smaller construction cost, thereby freeing funds for other purposes. This technique has been introduced in planning and designing the roads in Iran's Third Plan and will, it appears, enable the development of about one-third again the kilometer length of roads to a level of needed utility with the same construction outlay. This approach certainly does increase planning costs, but these costs, which appear relatively large in the planning stage, are more than justified in terms of construction cost savings.

Another cost factor of strategic significance in transport planning is, of course, that of maintenance—significant not only because the maintenance costs are relatively high, require a true foresight in terms of planned development of skills, equipment, and organization for the execution of the maintenance, but also because incompleted past maintenance or reconstruction should be a first claim on resources, *ceteris paribus*, prior to any further extension of new facilities. It should also be noted that there can be rather large variation of maintenance costs with changes in design. This suggests greater comparative analyses of original construction costs with the maintenance costs of transport media, at varying specification with various cost inputs of materials, machinery, and labor.

The maintenance problem in transport facilities is not only one of costs but one of administrative awareness and technical competency. Highly technical equipment or facilities can be purchased fairly readily (e.g., micro-wave telecommunication systems, diesel engines, etc.), but the cost of training competent maintenance personnel, the wage scale in the ministry sufficient to retain the trained personnel, the time factor involved—all add new dimensions. In a developing country in which planning, budgeting, and experience with major mechanical facilities and equipment is new, the appreciation of these facts is not readily grasped and maintenance is seldom given the attention it requires.

Similarly the administration of transport facilities to utilize the current physical capacities to greater effectiveness, prior to further investment in the facility, is perhaps as critical an issue in transport development, particularly in ports and railroads. The difficult calculus of determining whether a port organization improvement can be effected, needs to be a *sine qua non* prior to any additional investment to extend port capacity. This becomes most obvious when the issues involved are costed. The effective capacity of a port is not readily determined from the physical equipment provided but is largely a function of the co-ordination of the series of acts and movements of equipment, cargo, and administrative paper. The port of Khorramshahr on the Persian Gulf currently can handle approximately 400 to 500 tons per year per linear meter of quay; yet the same facilities handling the same types and flows of commodities in a Western European port might well average about 650 tons per year per linear meter of quay, while at Khorramshahr during World War II a rate as high as 1,000 tons per linear meter per year was achieved, albeit under abnormal conditions. Since cost of construction of additional quay, back-up warehousing, and facilities could well be of the order of magnitude of 4.0 million dollars per 100 meters of quay, an investment of this size to meet a rising demand for port facilities might be avoided by only a 10 to 15 per cent improvement in the administration of the port. Similarly in the railroads, where fixed capital costs are high, relatively small improvements in efficiency can effect a substantial increase in capacity and unnecessary overinvestment be avoided.

Certainly the difficulties of determining or quantifying benefits for the transport and communication infrastructure investment deserve or require that this sector of the economy be analyzed separately and probably in a manner quite distinct from the more conventional cost-benefit project approach used for other sectors. Most of the real economic benefits from transport facilities are indirect rather than direct and cannot be measured in value of receipts, nor in value-added, nor in quantities of product. The benefits to be derived from a port in the reduction of port costs and increases in port revenues can be calculated, but the full economic benefits derived from facilitating new investment, increased production and exports, reducing port and transfer time and hence reducing interest and insurance costs, providing an opportunity for increased markets both foreign and coastal, etc., are all difficult to quantify.

In fact, seldom can a conventional cost-benefit project analysis be put to decisive use in either the allocation of resources between the transport and communication sector and the rest of the economy or even between the various transport and communication media. Between projects within the same media cost-benefit analyses are far more useful than between projects in different media or in the broader resource allocation questions. In these areas the benefit estimates and the allocation issues regarding transport usually present themselves in more absolute terms which are not conducive to a simple cost-benefit calculus or they are not directly presented at all (as indicated earlier), since the problem is not foreseen. But where it is foreseen, while the question theoretically may be what are the relative benefits of identical investment in achieving more adequate port or rail facilities as compared with more adequate power stations or schools, the practical question posed is whether the foreign trade can be impaired and still achieve the other goals of, for example, foreign exchange earnings or reduction of import costs. A return on investment calculus will not be determining. Similarly, the decision as to whether a rail line should be extended will in the last analysis be made in terms of whether other industrial or mining goals could be achieved without the rail investment. In short, when the specific transport or communication demand is seen (calling for the passive role of transport investment), the decision is made more in terms of the benefits of achieving the other economic objectives for which transport is a complementary or supplementary necessity, and the issue resolves into one of being able to determine the most economic and technically feasible means of providing the transport or communication required.

Summary and Conclusion

Thus we have seen that when planning transport and communication development programs in relation to the rest of the economy, the economist is forced, due to both the planning process timing and the relative time perspectives, to frame the infrastructure development more in terms of basic factor analysis than in the detailed translation of individual commodity or trade requirements.

Also we have seen how conventional cost-benefit analyses are fraught with difficulties. Some of these difficulties are found in other sectors of the economy as well (e.g., in education and health), but in transport and communication in combination with our first finding, marginal cost-benefit investment analysis is limited in its usefulness. These two observations suggest that economic planning in transport and communication in developing economies needs to be made with an approach geared to the staged timing and long-run design of economc development; that integrated transport and communication development needs to be designed in terms of such basic factors as land mass, population, natural resources, trade, etc. in relation to the perspective values of the country's inputs and the technological and engineering constraints. Hence it is in these terms rather than in the more traditional short-ranged cost-benefit project analyses that the transport and communication economists should concentrate a far greater amount of their efforts.

TRANSPORTATION AND TECHNOLOGY

By Wilfred Owen
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Underdeveloped areas have two major advantages over the underdeveloped areas of the nineteenth century. The most important is the availability of advanced technical knowledge and the means for its effective application. When Europe and America struggled to provide the beginnings of transport mechanization, technology was extremely primitive. There was no machinery available to accomplish the clearing, grading, and other work preparatory to constructing roads or railways. Rails were made of wood, and explosives had to be invented on the job. There had been no progress in the study of soils and their stabilization, materials were inferior, equipment was unreliable, and numerous errors and accidents occurred because there was no background of experience on which to build.

Today the variety of transport methods and of techniques for getting them into operation is certainly the most obvious advantage that underdeveloped areas have in their favor. Modern technology offers the counterbalance that could offset many of the unfavorable factors that stand in the way of nations attempting to overcome their transport deficiencies quickly. It is no longer necessary to develop transport systems with crude tools, or to move laboriously from one phase of transport history to another as new inventions make their appearance.

Along with today's scientific and technological accomplishments, a second and related advantage for underdeveloped areas is their growing capacity for exercising a wise choice of what technology has to offer. The establishment of national goals and the beginnings of planning on a country-wide scale make it possible to use the fruits of technology wisely.

Charting a course toward higher living standards establishes the general dimensions of the transportation problem and makes it possible to relate transport investments to transport tasks. In earlier times it was the practice to leave transport development to chance, and to allow competing interests to build the largest possible mileage of railways, turnpikes, and canals, in the hope for profit. The days of the "robber barons" have passed, however, and in their place are planning commissions and international lending agencies. Removal of the pot of gold has dulled the pioneer spirit, and the result has been fewer miles and fewer millionaires. But the chances have been enhanced for building facilities where the needs are greatest and for lessening duplication and waste.

The High Cost of Moving

The combination of accumulated technology plus planned resource allocation has not altered the fact, however, that the cost of adequate mobility is very high. It took time and money for the economically advanced countries to achieve the physical facilities they now enjoy. Fifty per cent more U.S. capital was invested in railways at the end of the nineteenth century than in all manufacturing enterprises combined. Japanese and European experience was comparable. Today the time required to overcome transport deficiencies has been reduced by transport innovations, but the cost of doing what appears to be needed is much greater.

The large mileage of roads necessary to serve an entire country involves tremendous outlays even with the most modest standards of design. Yet the amount of money being spent for transport in most underdeveloped countries is still small in relation to population or land area. The outlay per capita for roads is less than $1.00 in Peru, Paraguay, Thailand, Nigeria, and Egypt, and as low as 30 cents in India and Burma, and 10 cents in Pakistan. In most of Western Europe, however, road outlays range between $15.00 and $30.00 per capita. In relation to area, the same wide discrepancies prevail. Road expenditures per square mile are approximately $14.00 in Iran, $27.00 in Pakistan, $52.00 in Egypt, and $56.00 in Nigeria, compared to between $3,000.00 and $11,000.00 in European countries.

Per motor vehicle, however, these outlays are highest in the less developed countries, since even modest outlays loom large when prorated among a small number of users. In some poor countries the outlay per vehicle is between $500 and $1,000 per year, compared to $124 in France and $148 in the United States. Roads in underdeveloped areas have many other users, of course, than motor vehicles; so that unit outlays are lower when carts, animals, bicycles, and other vehicles are included. But they are still high.

If the surfaced road network of South America, Africa, and Asia (excluding the Soviet Union) were to be as dense in relation to land area as the average for Western Europe, the required system for the underdeveloped areas would total 26 million miles. This compares with 526 thousand miles now available. If annual expenditures for road construction and maintenance were to be as great per capita as in Western Europe, the road bill for the underdeveloped areas would be 20 billion dollars per year compared to present outlays of less than 2 billion. To equip the less developed continents with commercial vehicles in sufficient numbers to achieve the European ratio of vehicles to population would require 25 million trucks and buses—six times the present total in South America, Asia, and Africa.

These facts emphasize the necessity for discovering new approaches to reducing costs and commitments. This means more careful weighing of transport alternatives, avoiding excessive mileage and overdesign, and using low-cost methods and indigenous materials.

Thus far transportation has commanded a very high proportion of public investment funds. But this emphasis on transportation has not necessarily been of greatest advantage to developing economies. In Colombia, for example, the 1959 national budget allocated 63 per cent of all investment funds to transportation and only 2 per cent to education and 2 per cent to health. In the current four-year program there has been a new emphasis on welfare, but 47 per cent of investment is still allocated to transport. In many underdeveloped countries transport absorbs a third or more of the total development plan. The importance of other neglected sectors raises serious doubts that this pattern is a healthy one.

Opportunities for Waste

These doubts are reinforced by the fact that transport by its nature provides unparalleled opportunities for making mistakes. Expenditures are frequently unwise, unnecessary, and untimely. High capacity railroads are built where traffic is below the minimum for economic operation; expensive roads are constructed where low-cost roads are sufficient; investments in all types of transport are lost through neglect of maintenance; competing facilities are created when the need is for facilities that are complementary; and poor organization, inefficient operations, and inexperienced personnel multiply the amount of capital required to achieve a given objective.

The point can be illustrated by the effects of overambitious road construction in the United States. In a 1950 inventory of roads in this country, thirty-two states reported that 148,000 miles of highways were providing no essential traffic function and should be discontinued as a public service. One state concluded that possibly one-third of its road mileage was nonessential. A Congressional study last year estimated that 30 per cent of railway mileage in the United States has no economic justification. Other waste in the form of unnecessary street mileage and poorly utilized equipment should provide impressive testimony that errors of U.S. transport policy are worth avoiding.

A Strategy for Mobility

What the underdeveloped areas need is a strategy for mobility which will take maximum advantage of the technological possibilities available to them. Often the transport programs decided upon are merely a combination of what independent bureaus of the government have submitted for each individual method of transport. Nowhere along the line has responsibility been established for weighing investment alternatives. By the time separate proposals have reached top echelons it is too late to review them as a total system, to relate them to the transport tasks to be performed, or to evaluate them in the light of emerging technology. The separate parts can only be pared down to yield a total for the transport sector that is a politically acceptable proportion of the over-all capital budget.

A strategy for moving people and goods will have to be based on two major sets of information: one is an evaluation of the capabilities of alternative transport media; the other is an understanding of what transport functions the economy will need to have performed. The task is to match these two sets of conditions and to do so for the country as a whole and for all transportation as an integrated system.

Despite different public policies and different stages of economic development, traffic patterns around the globe reflect the same general trends. The world's railroads are predominantly carriers of heavy bulk materials, primarily fuels, ores, metals, and building materials. Their economic advantage increases with volume and distance. The fact that in ten years the railways of the world have increased their freight by half a trillion ton-miles, or 45 per cent, indicates their importance. Many railways are still being used where traffic is too light, however, and for services that rail systems are inherently incapable of providing economically.

Technology has altered the role of rail transport. Today the motor truck provides the most economical service for light traffic, short hauls, small shipments, and for products that are fragile or perishable. The pipeline has established its superiority for the movement of petroleum and natural gas, and more recently has demonstrated a potential for the movement of coal and other solids that can be suspended in water. Inland rivers have increased their role with the advent of diesel tows and the increasing desirability of waterfront sites for heavy industry. Air transport has established an important role in cargo carrying even before the availability of aircraft specifically designed for this purpose. Recent cargo designs may cut present freight rates in half.

The view is often expressed that the latest in transport technology cannot be used to advantage in newly developing economies. This viewpoint often stems from an erroneous picture of the underdeveloped countries as being wholly immersed in the earliest stages of primitive transport. Actually, most underdeveloped countries are experiencing a mixture of all transport stages at once. Rural areas may be almost completely isolated, while the major cities and their connecting routes may reflect the most advanced stages of mechanization, motorization, and the air age. A single country may be partly victim of the same immobility that constrained the primitive societies of early history, and partly the beneficiary of the most recent forward push of twentieth-century technology.

This chronological mix means that there may be widely differing solutions to similar transport problems in a single country. Some remedies are precisely the same as those applicable to high-income countries. Jet aircraft and airports are much alike around the world. So are pipelines, diesel tugs, jeeps, and trucks. Solutions applicable to rural areas off the main transport routes, however, may still feature the donkey, the camel cart, and the country boats. In some cases the most modern technology may be needed where this will hasten accomplishment of of goals that transport development is meant to serve. In others it may be preferable to rely on primitive techniques and labor-intensive methods because of resource limitations.

The attributes of alternative transport methods, then, need to be weighed in the light of the environment to be served and the transport tasks to be performed. This means projecting what inputs will be entering the transport stream, what outputs can be expected, at what times, in what quantities, and over what routes. These data have to be related to the availability and condition of existing transport facilities and resources to determine the need for additional capacity and the most effective approach to providing it.

National plans provide a general picture, for example, of projected power installations and new industries. They will reveal probable plant locations, sources of raw materials, and the probable destination of final products. Agricultural production can be translated into probable inputs for transport, including fertilizer deliveries, the movement of crops to domestic and foreign markets, and shifts in location of production as a result of land reclamation and irrigation projects. The impact of urbanization, housing, and other public works likewise has implications for transport that can be roughly measured for purposes of estimating transport trends.

The importance of relating alternative technology to these probable transport demands is indicated by comparing transport capabilities with actual performance. In the United States, for example, railways are capable of providing passenger service at the low cost of 1.9 cents per seat-mile, but under normal conditions of light traffic density the actual cost is an expensive 6.9 cents per passenger-mile. This is more than two and a half times the passenger-mile cost of transportation by bus.

Railways are also capable of providing economical freight service where high-density carload traffic is being moved from a single origin to a single destination. In the United States the busiest 10 per cent of the rail system carries an average of 39,000 ton-miles of freight per day per mile of line. Costs per unit of traffic are very low. But at the other end of the scale, nearly one-third of the rail network is carrying only 555 ton-miles per day per mile—only enough to warrant a single train per week. Actual performance of transport services on these lines is very expensive compared to movement by truck.

But transport cost alone does not determine the preferred type of transport investment. Since transportation is only part of the cost of delivery, higher transportation costs often permit lower distribution costs through speed, reliability, frequency of schedules, savings in packaging, lowered inventory requirements, and reduced losses from bad weather, spoilage, or pilferage.

Further Transport Innovation

Transport innovations now in the process of development suggest that an effective strategy for mobility may be powerfully enhanced by entirely new systems and approaches, and that research and development to explore these potentials may be the greatest oversight in foreign assistance programs. Use of the fuel cell for motor vehicle power, for example, would mean in effect a return to the electric vehicle. The fuel cell would eliminate petroleum requirements and substitute compressed gasses made of plentiful hydrocarbons. Fuel cells would generate power for trucks and farm vehicles, greatly increasing power plant efficiency and lowering upkeep costs.

Another significant development is the ground effect vehicle, which operates just off the surface of land or water on a cushion of air. Further research may produce large vehicles traveling up to thirty feet off the ground. For underdeveloped areas this form of transport introduces the important possibility of eliminating the need for expensive road surfaces and of coping with the rainy season. New developments in vertical take-off and landing aircraft may ultimately prove a further boon to countries suffering from inaccessibility.

Most types of liquids and solids may someday be moved in sealed containers interchangeable among road, rail, air, and marine transport. Advantages would include reduction in damage and loss and in the time and cost of loading and unloading. Containers may prove to be the catalyst that integrates the various components of the transport sector which are now being independently planned, financed, and operated.

While the container is generally thought of as a laborsaving device, its importance to underdeveloped areas lies in the fact that it is a capital saving device as well. When container ships are loaded and un-loaded, it has been found possible for a crew of men to move 500 tons per hour compared to 25 tons by conventional methods. Containers reduce the need for berth capacity by speeding port operations, and they stretch the supply of shipping space by shortening turn-around time for cargo vessels.

Containerization is particularly advantageous in underdeveloped areas because of frequent transshipments where the transport system is incomplete. Rail equipment can be utilized more effectively when containers rather than rail cars are used for storage. Containerization may also simplify freight rates by providing a tariff in cents per mile per container, regardless of contents. Substantial gains would be realized by replacing the confusion and paper work of the present complex commodity rates.

Reducing Transport Requirements

The application of science and technology to the transport field may ultimately make a more significant contribution by eliminating the need for transport rather than merely supplying more effective methods of movement. Every avenue needs to be explored to reduce unnecessary transport requirements, both physical and financial, if we are to overcome the tremendous cost in time and money that the movement of people and goods entails. A successful attack on transport demand may also be the most effective approach to shifting resources from transport to other neglected sectors of the economy.

One approach to reducing transport demand is suggested by the fact that an industrializing society needs very large amounts of energy for heat, light, and power. The task of transporting the sources of this energy is often one of the major burdens on the transport system.

The sun is one of the promising possibilities for throwing off this burden. It is now feasible to cook, heat homes, provide light, and operate radios on solar energy. A solar water heater and a solar still for desalting sea water have been developed. These possibilities are of particular importance to low-income countries, for lands poor in transport are frequently rich in sunshine.

New capabilities for long-distance transmission of electric power furnish another promising method of reducing transport requirements, either by extending the radius of hydroelectric power distribution or by locating thermal plants at coal fields. The cost of constructing a new generating plant and a 350-mile high-voltage line from the West Virginia coal mines to the Washington metropolitan area will be more than offset by savings in the cost of transporting coal. The feasibility of national networks of power transmission lines could have a major impact on transport investment decisions in newly developing countries, since on many of the world's railways one-fourth to one-third of total traffic is coal.

A further possibility for reducing transport needs is the reduction of agriculture's dependence on rapid transport. This can be accomplished by preserving and processing foods and by extracting edible proteins from grass and leaves that are available nearly everywhere but cannot be digested in their natural state. The production of edible protein from peanuts is an example of the concentration of food values to ease the problem of transportation.

Another extensive field for development is the substitution of communications for transportation. A century ago, transport and communications were a single field because communication was possible only by transporting messages. But with the development of telegraph, telephone, radio, and television, communications no longer depend on transportation and are often an effective substitute.

The practical implications of these altering circumstances are highly relevant to the task of overcoming transport barriers. The limited capacity of the transport system in underdeveloped areas can now be compensated by communications that achieve with relative speed and economy the political, social, and cultural bonds that would otherwise have to await the building of roads, rail lines, and other transport facilities.

Classroom radio and television can provide a partial substitute for transporting pupils to consolidated schools, and they can multiply the effectiveness of scarce teaching personnel. In Colombia and Bolivia, mass education by radio is being accomplished in writing, arithmetic, agriculture, and in public and personal health. Operation of world-wide television and the use of communications satellites to expand the radius of telecasting may help to compensate for the slow speed and high cost of transportation solutions.

The Unresolved Problems

The potentials of modern technology are imposing, both within the transport field and in other sectors of the economy where new processes may importantly affect the demand for transport. Yet despite the extensive transport programs going forward in newly developing areas, technological potentials are being only partially realized.

The basic problem is failure to take advantage of what is already possible. More needs to be known and made known about the costs, operating characteristics, and performance records of alternative transport media from the experience of the more developed countries. There is an untapped wealth of information in the experience of foreign assistance programs and international lending agencies over the past decade. We need to know what results followed from transport investments of various types under different circumstances. We need to analyze past procedures, successes, and failures.

Another drawback to realizing the benefits of changing technology stems from the fact that each segment of the transport system is separately provided and programmed without full consideration of available alternatives. This situation calls for an overhauling of transport administration and planning responsibility to permit a total transportation look.

The larger view must also include greater effort to relate transport decisions to national goals. Especially important is the need for appraisal of how transport demands might be averted altogether. It is this approach that holds the hope for directing a larger share of development efforts to neglected programs of housing, health, education, agriculture, and industry.

We need an imaginative program of research and development that will focus on new techniques of transport and new techniques for avoiding unnecessary transport. Our knowledge of how best to overcome the drag of poor transport in poor countries is still primitive, and we are making no organized effort to learn. This is how things stand today in an area that pre-empts one-third to one-half of foreign aid funds.

There is need for an international focal point, a world center, dedicated to a better understanding of the relation between immobility and poverty. The task, to be shared by both developed and newly developing countries, is to marshal the facts already available, to analyze the wealth of experience that foreign assistance programs have provided, and to stimulate scientific discovery and applications specifically aimed at the solution of transport problems in low-income countries.

DISCUSSION

JAMES R. NELSON: The Kaufmann paper comments: "In a developing economy there are . . . many obvious transport and communication facilities which are at all times currently and compellingly required, but even they must be planned and designed with a time vision far exceeding the specific demands known or being forecast by the plans of industry and agriculture."

I can suggest no pat formula for avoiding this dilemma, but I would like to ransack the papers for clues to possible ameliorative action.

Clue Number One is the Heymann paper: the possibility of predicting general policy goals in underdeveloped countries. His paper is concerned, of necessity, with the special case of air transport, and therefore refers only to the prestige allure of an international service. But the Heymann approach can be generalized in this way: given the goals to which countries which wish to develop are committed, at this particular point in history, what economic consequences may be expected to follow, and what economic actions may be taken to achieve at least a relative, or second-best, maximum or optimum? This is political economy through the looking glass: instead of the classical end of "greatest wealth" and the classical means of "this is what you do," we start with "this is what you do" and end with "greatest wealth subject to this constraint." (On second thought, this modern response to a given political context should probably be called "political economy," because the tradition beginning with Adam Smith was essentially that of economic politics.)

Assuming that certain economic goals must be taken for granted in developing countries, what are they?

The most obvious is a tendency to reduce the importance of international specialization. This may be wise, in the sense that the area previously specialized in some product which is due to become a drug on the international market; it may be unwise, in the sense that the country has overwhelming comparative advantages and disadvantages. It may be outright folly: the country may have no economic reason for existence. The tendency to reduce international specialization may be the occasion for a growth, or an accelerated growth, in real income—due to the application of a dynamic policy in an area which is customarily viewed by economists as a problem in comparative statics—or it may impede or even reverse economic growth. Haiti has less foreign trade than it had in the eighteenth century and has certainly not leapt forward in real income on that account. But the autarchic tendency appears to minister to universal psychological needs in developing countries.

Assuming that this tendency to reduce international specialization must be taken for granted, what is its relevance for transportation policy? Since the railroads have traditionally been the carriers of bulk commodities to the ports, and of imports to a few main consumption centers, the general moral of this decline would seem to be: when in doubt, plan for highways and trucks.

Clue Number Two may be derived from both the Owen and the Kaufmann papers. The former says: "Transportation is probably responsible for greater waste than any other area of economic activity because it provides unparalleled opportunities for large errors, unwise expenditures, and wasteful employment of resources. . . . The task of financing an adequate road program, for example, is a difficult problem for countries in all stages of economic development. . . ."

While the Kaufmann paper comments: "Transport project costs are not only lumpy and large but they also often have the tantalizing variable of fairly wide ranges of costs with relatively small changes in specifications. . . ."

These two passages lead me to observe that transportation expenditures are not only a dependent variable in economic development; they are also an independent variable with an important influence on who and what as well as on how, when, and where. In particular, there can hardly be an economic area involving so close a relationship between public expenditures and the creation (or elimination) of economic surpluses. Here the problem of Balkanization which lay behind the previous point about the inward-looking economy may be compounded by a problem of excessive centralization. American practice developed at least two approaches to transportation which could well be spread to underdeveloped countries: the local subsidy and the special assessment. Highway finance is necessarily public finance. Public finance is possibly *the* great restraining factor in most developing countries. A great tragedy of the last fifteen years is that economists in underdeveloped countries have learned so much about liquidity preference when they should be pondering illiquidity preference. The appropriate assignment is from Ricardo, not Keynes.

Finally, I would like to express my only dissent, and a mild one at that: I agree with the Kaufmann paper that "a return on investment calculus will not be determining." I can think of a number of reasons why this should be so. The essence of economic development may be a refutation of Marshall's *Natura non facit saltum*. Transport expenditure may create new economic space as well as exploit its prior creation. And investment calculations are apt to be misleading in an environment of non-marginal change. But particularly in the absence of appropriate measures for governmental recapture of economic surpluses, a calculation of return on investment may be indispensable both as a first approximation to an economic policy in the abstract and as a weapon to keep the local political wolves at bay.

TRANSPORTATION PROBLEMS IN THE AMERICAN ECONOMY

FEDERAL TRANSPORT REGULATORY POLICY

By MAURICE P. ARTH
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This paper seeks to identify steps which should be taken to improve federal regulation of transportation through an evaluation of reports, studies, and protests in this field; namely, the Weeks and Mueller reports, the Hector and Arpaia protests, the Doyle study and the Landis report.

I. *The Weeks Report*

The Weeks report[1] was prepared in 1955, in response to a request from President Eisenhower, by a cabinet committee chairmanned by Secretary of Commerce Sinclair Weeks. Probably the two major ideas contained in the report are, first, that regulation designed to protect against monopoly has resulted, in today's competitive situation, in dislocations and inefficiencies which cost the public billions of dollars a year, and, second, that the cure is to free self-regulating competitive forces from unwise federal regulation.

In spite of the President's request to review federal government organization, the Weeks report did not propose seeking structural reorganization of federal institutions. Instead, it sought to free the transportation industries from the effects of harmful government regulation by textual changes in the Interstate Commerce Act, including a revised statement of National Transportation Policy.

It recommended freer establishment of rates, seeking to avoid prescription of rates but retaining maxima and minima. It also proposed new criteria for determining maximum and minimum rates. Thus, it suggested abandoning protection of competitors as a chief criterion (except as national defense considerations might intervene), replacing this at the bottom of the rate range with recovery of out-of-pocket costs and at the top of the rate range with avoidance of undue charges to the public in what the committee felt were those few cases in which natural competition does not restrain. On balance, the report sought continued, broadened, but less constraining federal regulation than at present.

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[1] "Report of the Presidential Advisory Committee on Transport Policy and Organization," to the President, Apr. 18, 1955.

The analysis appears valid and the prescription was potentially helpful. However, the legislative success was disappointing, particularly with respect to adoption of a new statutory statement of National Transportation Policy. Also important is that such dramatic changes require not just new policy statements and changes in substantive laws but also changes in the implementing mechanisms, including improvements in agency organization, process, and personnel (subjects which the Weeks report did not cover).

II. *The Mueller Report*

Five years later President Eisenhower asked a different Secretary of Commerce, Frederick A. Mueller, to undertake another comprehensive study[2] of national transportation. Sensitive to criticisms that the Weeks report had placed an excessive confidence in competition as a self-regulating factor in the public interest, Secretary Mueller carefully stated his report was something different, although still based on "American free enterprise principles." He also placed great emphasis on the importance of gradualism in accomplishing change.

The Mueller report joined the Weeks report in expressing concern over the impact of unregulated private and exempt carriers. It suggested that common carriers develop service standards and rates more competitive with those of unregulated carriers by bringing traditional rates more closely in line with costs. Regulation was said to be required to counter the tendency for sporadic and selective rate cutting, but on a more flexible basis to encourage adjustments, especially in below-cost rates and losing services. Unlawful minimum rates were to be limited to those rates below long-run marginal costs. Prescription of maximum rates was to be at not less than the full cost of the service involved. The report recommended eliminating restrictions on operating certificates as to routes and points served within authorized territories and as to commodities carried. It also proposed retaining present restrictions on common ownership of rail and truck services except where increased efficiency and public advantage outweigh the possible reduction in competition.

Other major emphases in this report included: greater accent on research, especially in cost finding and through a census of transportation; government action to relate investment to needs and user charges to benefits; greater government use of commercial transportation for its own needs; reduction and, to the extent possible, elimination of subsidies; encouragement, but not compulsion, for thorough routing using intermixtures of various modes of transportation; and study by labor and management of the interrelated problem of wage rates and working rules.

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[2] "Federal Transportation Policy and Program," U.S. Dept. of Com., Mar., 1960.

The sole new permanent federal instrument proposed, new joint boards aside, was an effectively staffed research and recommending office in the executive branch.

The Mueller report proposed to accomplish the same overriding objective of the Weeks report: creation of a more efficient national transportation system within the framework of existing agencies and institutions. However, the later report contained far more pervasive recommendations affecting every sphere of transportation and involving major new policies and approaches as well as legislative changes and additions.

III. *The Hector Protest*

Louis J. Hector accompanied his resignation from the Civil Aeronautics Board in the latter part of 1959 with a vigorous protest[3] to the President that he was "convinced that an independent regulatory commission is not competent in these days to regulate a vital national industry in the public interest."

Mr. Hector recommended that: adjudication of major litigated cases and review of appeals from administrative action should be performed by an administrative court, free from policy making or administrative detail; policy making, planning and administration, and routine administration of economic regulation should be transferred from regulatory agencies to an executive agency; and investigation and prosecution should be transferred to an executive agency such as the Department of Justice.

No doubt such separation of responsibility for major cases and for routine economic regulation, i.e., minor cases, can be made between a commission and its staff where safeguards can be developed. However, it is difficult to see how the necessary degree of co-ordination could be achieved between an independent administrative court and an agency of the executive branch.

Similarly, it is hardly conceivable that the policy-making process can be carried out in such a way as to preclude the development of a large part of policy in the context of decisions on individual cases. How an administrative court, therefore, could deal with the type of major cases which arise in the transportation field without getting into policy functions is difficult to imagine.

It may be concluded that the Hector memorandum is illuminating in its protests of the defects of regulatory commissions. However, its bold and vigorous recommendations do not constitute the kind of a detailed, workable model for action needed to solve existing problems.

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[3] "Memorandum to the President—Problems of the CAB and the Independent Regulatory Commissions," by Louis J. Hector, Sept. 10, 1959

As a footnote, two lengthy replies[4] were prepared by the board's Office of General Counsel taking exception to substantially all of Mr. Hector's points.

IV. *The Arpaia Protest*

Several months later, Anthony Arpaia, just prior to resigning as a member of the Interstate Commerce Commission, delivered two attacks[5] on the Interstate Commerce Commission.

Mr. Arpaia concluded that the Commission—as an independent agency performing a blend of quasi-judicial and quasi-legislative functions—is a necessary instrument of government. However, he felt that the duties which are essentially managerial or administrative should be separated from the others by a vertical division of the Commission into two bodies. In fact, he suggested the Commission's activities should be assigned to three separate agencies concerned with (1) planning, (2) economic regulation, and (3) administrative or executive functions.

In order to improve the ability of the Commission to handle the problems of economic regulation, Mr. Arpaia recommended streamlining the Interstate Commerce Act, revising the Commission's organization to handle the economic problems of transportation, relieving it of trivia, delegating additional functions to boards of employees or to single employees, and other changes.

Both Mr. Hector and Mr. Arpaia apparently agreed in placing in the executive branch both the over-all planning and co-ordination functions as well as the administrative and executive functions. Perhaps the chief difference is that Mr. Arpaia suggested continuing the regulatory commission to handle quasi-legislative and quasi-judicial matters, while Mr. Hector proposed assigning quasi-legislative functions also to the executive branch and quasi-judicial functions to an independent administrative court.

V. *The Doyle Report*

The Doyle report of December 29, 1960,[6] was prepared at the request of the Senate Committee on Interstate and Foreign Commerce by a study group under the leadership of John P. Doyle.

One of the document's major conclusions is that if present trends continue, by 1975 private and contract carriage can be expected to account for half of intercity freight, and regulated common carriage may have become so eroded as no longer to be able to maintain a broad service for the general shipping public. Another major conclusion is that, as common carriers continue to decline relatively, the social investment cost per ton-mile and per passenger-mile in transportation service is increasing and will continue to do so, *inter alia* benefiting nonregulated highway and water transportation.

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[4] "Comments of the Civil Aeronautics Board on the Hector Memorandum to the President," Civil Aeronautics Bd., Mar. 29, 1960.

[5] "The Brass Tacks of the ICC Administrative Problem," Jan. 6, 1960, and "What Are We Waiting For?" Mar. 11, 1960, Anthony Arpaia, Member, ICC.

[6] "Preliminary Draft of a Report prepared for the Committee on Interstate and Foreign Commerce, United States Senate," by the Special Study Group on Transportation Policies in the United States (U.S. Government Printing Office, Jan. 3, 1961).

With respect to organizational matters, the Doyle report recommended: creation of a Joint Committee on Transportation in the Congress; consolidation of the CAB, ICC, and Federal Maritime Board into a single Federal Transportation Commission which would exercise the major functions of economic regulation and closely related activities; creation of a Department of Transportation within the executive branch to include: (1) certain existing agencies and the transport programs they administer, (2) certain executive type functions currently being performed by the ICC, CAB, and FMB, and (3) responsibility for policy formulation and surveillance of administration of certain other transportation functions presently performed by other executive agencies; and creation of a Transportation Circuit Court of Appeals.

In the economic area, the Doyle report recommended a closer relationship between costs and pricing, seeking a better distribution of transportation resources through competitive rates reasonably related to long-run marginal costs. It proposed an extension of the highway trust fund concept of user charges for motor carriage to air and waterway transportation. In treating the discriminatory policy against railroad ownership of other modes of transportation, it recommended that ownership of one mode by another be permitted when in the public interest. It put emphasis on a cost finding program to define and determine the appropriate long-run marginal cost of providing service, suggested as the rate floor. It also raised a major question about a trend in CAB decisions to extend federal authority to adequacy of service in such a manner as to threaten a move from regulatory to managerial functions.

It may be noted that the rather active discussion of twelve months ago about a federal department of transportation has largely evaporated, and it remains to be seen what if any major effect the Doyle report will have.

VI. *The Landis Report*

On December 21, 1960, Mr. James M. Landis submitted a report[7] to President-elect Kennedy on regulatory agencies. The report began with a frank and candid declaration that the continued existence of the regulatory agencies is obviously essential for effective government.

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[7] "Report on Regulatory Agencies to the President-Elect," James M. Landis, Dec. 21, 1960.

Mr. Landis pointed to the emphasis of twenty years ago on the procedural aspect of administrative regulation and adjudication leading in 1946 to the Administrative Procedure Act; to later emphasis on conflict of interests and ex parte presentations and an effort to transfer certain adjudicatory functions to administrative tribunals or courts; and more recently to emphasis on a less legalistic approach treating the agency more as a managerial mechanism. Here he gave credit to the work of such persons as Professor Emmette S. Redford, of the University of Texas, and to studies by management consulting firms for the Bureau of the Budget.

Mr. Landis concluded that the question is not whether planning is delegated to an executive agency or a commission, but whether the individuals involved are able to discharge this responsibility and free to use flexible procedures. He felt failure to make policy other than through the adjudicatory process is due primarily to pressure of business on the adjudicatory side. He also pointed to the constitutional duty of the President to see that laws are faithfully executed whether entrusted to regulatory agencies or not.

The Landis report was directed at improvements in operations of regulatory agencies without fundamental change in structure. Its recommendations are primarily to do with internal organization, processes, ethics, and personnel. The only new instruments proposed were co-ordinating and overseeing offices in the Executive Office of the President. Attention is devoted to economic issues primarily as examples for support of other points.

Mr. Landis' suggestions for overseeing offices in the Executive Office of the President were notable by their omission from subsequent recommendations by the President to Congress, in some degree reflecting the vagueness of the rationale adduced for this particular solution. In fact, throughout all the reports reviewed above, it is at the point of dividing powers between the executive branch and the commissions that the organizational proposals become most vague—if not in broad concept, then in the indistinct nature of the models developed to deal with the practical problems involved.

VII. *Synthesis and Conclusions*

The problems raised in these several examinations of transport regulation can be sorted into five major categories: economic and other policy, organization, personnel, processes, and ethics, the latter of which will not be commented on further.

Economic Policy. Substantially all those making these studies—if not all those affected by them—would appear willing to accept the following positions: The public interest in common carrier transportation is so great as to demand regulation. Regulation must deal with questions of entry, minimum service, rates, safety, and corporate soundness. Regulation should encourage that allocation of resources most in the public interest. This objective can best be accomplished within the framework of open competition among carriers and modes of transportation. Optimum allocation of resources would require equal treatment of carriers by the federal government, and some kind of user charges to equalize costs where this cannot be achieved. Meanwhile, the government must protect the public against overcharges and competitors against the establishment of rates below a level which will not return long-run marginal costs. Certain overriding public interests, such as defense needs, also will require special protection to certain carriage. Probably most would agree that common ownership of differing modes of transportation should be permitted when in the public interest. Finally, regulation should permit flexibility, not be a strait jacket.

Thus, the economic issues are relatively clear, as are the broad principles which form the basis for solving them. That more is not being done to weave them into the fabric of our transportation system through agency-level policy and rate making and the warp and woof of individual decisions is because of the difficulty faced by the organizational and human instruments in grasping and carrying out economic policy. (Of course it is also because of pressures engendered by elements in the industries regulated which would be adversely affected.)

Organization. The reports may be divided into three groups as to their consideration of organization: those which largely ignore this question (Weeks and Mueller), those which feel that present organization in fundamentals is poor and propose basic changes (Hector, Arpaia, and Doyle), and those which state that present organization is relatively good but ought to be improved (Landis).

However, it is by no means clear that the structural defects in the regulatory commission are greater than those that would exist in any of the other "systems" proposed. In fact, on balance, the regulatory commission is a remarkably resourceful device for accomplishing the task of industry regulation.

Nor has a particularly persuasive case been made for combining the ICC, CAB, and FMB into one economic regulatory agency. There is much to be said for common treatment of the various domestic surface transport modes. However, the arguments for separate agencies to regulate air transport and ocean shipping outweigh those for a single over-all agency designed to better resolve the relatively few problems which involve more than one of the present agencies.

Furthermore, separation of functions within the agencies indeed has pretty well resolved the problems of combining the several areas of rule making, investigation, prosecution, and adjudication in one agency.

It also seems probable that the proposal for a department of transportation would not be an effective way of handling the functions proposed for assignment to it. Furthermore, it would appear very difficult to resolve relationships between it and the independent agencies charged with economic regulation.

In fact, the great organizational defect in the system of regulatory commissions appears to be the lack of adequate relationship to the executive branch. Probably the most persuasive case in the organizational area is that for some better instrument for formulation of policy recommendations and for co-ordinative oversight by the executive branch. Here it seems likely that to create an office in the Executive Office of the President would be the beginning of a process by which a very useful co-ordinating mechanism eventually might be provided.

Personnel. In the field of personnel, many commissioners of course are of the highest caliber. Nevertheless, outside observers frequently have been critical of the over-all quality of appointments to commissions and to their staffs. Some place emphasis on defects of White House appointments. Others feel it is difficult to attract capable men to these positions because of the difficulty of providing unique service, the attacks upon the commissions, and the problems of ex parte presentations and associated ethical problems. Some point to the opportunities for men of outstanding competence to move along to jobs paying considerably more in the regulated industries (not necessarily involving ethical considerations).

Two things are of the greatest importance in this area. First, the President should recognize the key nature of these positions in making appointments. Second, capable people should be moved to the commissions at top staff levels, as well as promoted from within, in order to bring fresh blood and vigorous leadership to the agencies. Also important are limitations on the numbers of commissioners, increase in their salaries, and effective delegation to the chairmen of the responsibility for administering the agencies.

Processes. In viewing processes, while nearly all favor adjudicatory processes for resolution of issues involving contending parties, some attack them as overjudicialized and plead for treatment of a larger part of the matters which come before the commissions by more flexible process which makes freer use of expertise. Others appear to feel that the values of deliberation by a multiple body in the context of much "due process" more than offset the advantages of a more efficient administrative process. Most would resort to adjudicatory processes for administration of agency sanctions in economic regulation. Nearly all would find an executive-type process desirable to carry out the enforcement functions of education, investigation and court prosecution, and other executive functions.

On balance, it would appear that judicialized processes should be held to a minimum. At the level of the commissioners themselves, there should be no barriers to address any facts and to procure any advice needed to reach wise decisions.

Further, the attention of these groups of five or seven or eleven men must be limited to the most important matters and executive issues. They cannot personally reach all of the decisions which must be made by the federal government in regulating transportation in our vast country; it is defeating to assume they can. Therefore, decisions and reviews in all but the most important cases must be delegated responsibly to staff elements. Furthermore, those decisions that are made by the commission usually must be drafted by staff. Commissioners should be provided carefully drafted, recommended decisions, well articulated on the basis of the facts, law and precedents, rather than requiring their best lawyers to construct rationales for decisions after they have been reached by a group of busy and pressed men on the basis of limited familiarity with the evidence. This process should also be rendered responsible by institutionalization rather than be informal and hidden.

The above analysis leads to the question of what can be done to get the federal government to carry out wiser economic policies with respect to railroads, inland and coastal water carriers, trucking, pipelines, air lines, and merchant marine shipping. The indictment is not mainly of the economist. He already has done much to clarify the broad watersheds of economic policy considerations. Much more will always need to be done at all levels of economic study, and in particular, at this point in time, the economist can render further yeoman service by continuing to explore the implications of the application of broad economic policy desiderata to individual cases. The more important problem is primarily in the instruments of regulation—human, organizational, and procedural—which simply have not had the desired capacity for wisely and speedily carrying out transportation regulation.

Of course, there can be no terminal resolution of these problems. Rather, the solution involves the never ending struggle to improve the policy, the machinery, and the personnel of government activity. It is through the activities of men that regulation is carried on, and one upper limit to the effectiveness of regulation is set by the capacity of the people involved. In these circumstances, perhaps the single greatest step which can be taken to improve transportation regulation is ever wiser Congressional and executive branch leadership coupled with appointments of stronger, better people—in the context, of course, of better articulated policy, strengthened organization structure, and more efficient processes.

THE PRICING OF HIGHWAY, WATERWAY, AND AIRWAY FACILITIES

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User fees for public transport facilities have had a long tradition in the United States. Today, only waterway users hold out as a matter of principle, the airlines maintaining that they cannot bear airway user fees in this period of financial crisis and technological revolution.[1]

At this juncture, therefore, it might appear surprising that a controversy exists in economics circles over the social desirability of user fees, at least for certain functions of pricing. Yet the marginal-cost pricing criterion for user fees and social surplus criteria for investment are being advocated for highways by some economists in Great Britain and elsewhere.[2] According to sponsors of the former criterion, low or zero use fees are advocated as useful to society in economizing by encouraging fuller use of the excess capacity in bridges or highways; and high use fees, as useful in economizing by discouraging overuse of congested but preferred highway facilities and by transferring some highway use to less preferred and less congested routes. Since user fees limited in this way may not create total revenues sufficient to attract capital to highways and in limited cases may yield more revenues than could be invested efficiently in highways, the marginal-cost pricing economists tend to deny that any relation, or close relation, should exist between user fees and capital investment. The rule of self-liquidation as a general guide to efficient investment is thrust aside as unnecessary and as a substantial hindrance to efficient utilization of existing highways. What specific rule for efficient road investment is to be substituted is far from clear; presumably it would be a matter for planning according to social surplus criteria of investment, often involving subsidy expenditures.[3]

While many thoughtful Americans might argue that all such economic advocacy should be set aside as foolish and downright impractical, it cannot, and should not, be dismissed so easily. For plainly, despite the vast highway modernization that user fees brought since the early twenties, some things are clearly wrong with the American public transport policies that have emphasized coverage of total costs with user fee revenues.

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[1] Testimony of Stuart G. Tipton, President, Air Transport Association of America, before the House Committee on Ways and Means on the Travel Tax and the Aviation Fuel Tax, May 10, 1961.

[2] M. E. Paul, "Covering Costs by Receipts," in The Economics of Roads, *Bul. of Oxford Univ. Inst. of Statis.*, Nov., 1960, pp. 299-311; A. A. Walters, "Taxation and Transport," unpublished manuscript sent to the writer June, 1961; and H. Hotelling, "The General Welfare in Relation to Problems of Taxation and of Railway and Utility Rates," *Econometrica*, July, 1938, pp. 242-69.

[3] For a critical examination, see C. D. Foster, "Surplus Criteria for Investment," *Bul. of Oxford Univ. Inst. of Statis.*, Nov., 1960, pp. 337-57.

It is pertinent at the outset to note the economic functions ideally expected of user fees under the prevailing American concept. Normally user fees are set in the expectation of recovering total costs and they spread the burden over all user beneficiaries in some relation to relative cost or use: (1) user fees over the long run encourage or discourage public investment according to effective demand for improvements of particular standards at particular locations and, at the same time, increase or impose limits on total capital expenditures; (2) user fees provide revenues for maintaining and operating public transport facilities; (3) user fees, especially tolls, influence use of particular facilities by limiting congestion, encouraging use of other routes, and sometimes by encouraging fuller use of underutilized facilities; and (4) user fees, by raising carrier costs approximately to true economic cost levels, serve to divide traffic between competing modes more rationally on the basis of consumer choice.

Americans are becoming painfully aware that those functions of user fees have not been realized sufficiently, or at all in some fields. To the credit of user fees, vast modernization of principal highways has been accomplished, together with general improvement of secondary and country roads. On the other hand, past user fee policies have not brought about sufficient expressways and parking facilities to avoid wasteful congestion nor have they prevented overuse of preferred highway routes by limiting demand and by transferring use to less congested routes or modes. Nor have they limited the mounting social costs of highway noises, fumes, and smog. The suspicion has grown that the conventional American highway preference yields an inadequate urban transport solution and positively destroys some advantages of urban living. And although the dismal long-term implications of highway policies for maintenance of rail commuter services have long been pointed out, Americans now realize that the problem of inadequate mass transport service has finally come to rest in their collective laps, together with the inevitable alternatives of changing public policies drastically or electing extension of subsidies to the railroads. The worsening railroad situation has now become so critical that the free waterway and airway use policies have come under heavier attack than ever before. It has become more generally realized that shipper choice cannot rationally divide traffic unless the special and recurrent costs of use of public facilities are assessed to users and charged out in rates. And understanding has spread that wasteful overinvestment inevitably occurs under current policies. Consequently, pressure has grown stronger for closing the gaps in user fees and for revising their structure in closer conformity with their functions as prices in promoting allocative efficiency.

User Fees and the Urban Transport Problem

One cannot attribute the urban transport problem of today to the lack of highway user fees, for they have existed since the advent of motor vehicles. What, then, is the difficulty?

As the marginal-cost pricing economists maintain, the highway system average-cost user fees assessed simply are not high enough to perform the consumer-rationing function of efficient prices at peak hours and with respect to peak directional traffic flows and the best highway routes. Only minimal use is made of user charges as demand-limiting prices, both in terms of encouraging use of the less congested routes and of increasing traffic flows by subways, buses, and commuter trains. And zero or nominal parking fees have been unable to restrict demand for parking spaces or sufficiently to transfer it to fringe areas. At the same time, the standard user charges and municipal apportionments have not financed sufficient facilities to take care of traffic demands where not limited by higher fees. Many well-located expressways shortly become congested. On the other hand, congestion is less on toll roads assessing higher charges better suited to the demand-limitation function.

The economic remedy is higher prices for urban highway use and for on-street parking, at least for the best-located or best-designed facilities and during periods of peak use. The alternative is far more direct rationing of the time-use and route-use of motor vehicles than prevails today and the classification of vehicles according to standards of essential use. Hence, aggressive attention to the structure of user fees is indicated, with more differentiation and flexibility in particular user fees. Contrary to some marginal-cost pricing economists, more, rather than less, use of tolls is implied, with application of supplementary tolls at peak periods or on routes of heavy use. The administrative cost would be preferable to policing rationed expressways and streets except where direct rationing is self-enforceable. A price-rationing scheme permits each motorist to determine in terms of the exigencies of each situation whether it is desirable not to drive at all, or to drive along a less congested route, or to leave one's automobile at a suburban mass-transit station, whereas direct rationing makes the choice grossly according to class of use or users. But either solution promises vast economies in relieving congestion by spreading highway use over all available routes, by stimulating use of underutilized transit or commuter facilities, and indirectly by encouraging greater investment in mass transport. Indeed, mass transport may yield far greater long-term efficiencies than the highway solution, considering the new capital investment and the displacement of existing land uses involved in developing urban expressways.

So far, the marginal-cost pricing criterion applies except for Alan Walters' advocacy of the wholly unworkable scheme of higher gasoline taxes in urban areas than in rural areas in preference to wider use of specific or supplementary tolls.[4] For it insists that user charges for congested routes should equate the private marginal cost of the peak user with the social marginal cost of his use. That criterion might also be helpful in justifying low user fees on routes with significant excess capacity and where the demand is price elastic, but such fees should at least recover the short-run marginal costs of road maintenance and operation.

But the marginal-cost pricing criterion does not assure capital attraction or limitation as well as the prevailing revenue-coverage practices. The revenues from high fees on the former criterion might happen to finance all justifiable projects. But this would not necessarily be true and low or zero user fees on noncongested routes would often work against the objective. Nor would the self-liquidating test be available for limiting investment to modernization that is economic. On the other hand, there could be an advantage in eliminating the rigid linkage between total user revenues and highway investment. Excess earnings on such toll roads as the New Jersey Turnpike, or from supplementary tolls on highly congested highways, could facilitate general tax adjustments or be invested in terms of the urban transport problem as a whole.

User Fees and the Country Road Problem

Some marginal-cost pricing economists contend that rural-area roads should be free or almost free of use charges. Such roads are often underutilized. Thus, the social marginal costs of use are nil and the marginal costs to the road authorities may be slight. A zero, or nominal, use charge would maximize benefits by encouraging fuller use, but still permit country roads to be paid for by assessment of property taxes or registration fees on road beneficiaries.

This position overlooks several things. First, the implicit assumption that demand is price elastic is unlikely, at least in numerous cases. Zero user fees would not create much more country traffic. Second, low-grade roads and bridges are used by heavy trucks, often with considerable damage, or at the cost of improvement to higher standards. Thus, special user fees are quite justified. Free use would entail waste of resources. Third, persons other than landowners and truck owners utilize country roads at some cost in maintenance. At least, such marginal road cost should be assessed to them, even average-cost fees if their use is not curtailed. Finally, whereas differentiated fuel taxes are unenforceable, the apportionment of user earnings to the road systems generating them is feasible assuming appropriate political attitudes. Hence, advantages derive from customary use charges while avoiding overinvestment by levying general taxes on benefited property and limiting apportionments of user funds.

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[4] A. A. Walters, *op. cit.*, pp. 13-14.

User Fees and the Road-Rail Problem

The extent to which subsidies result from American user fee policies and have contributed uneconomically to traffic diversion has never been settled. User charges are not major items of costs to highway users. And it is clear that far higher user fees are indicated for large and heavy vehicles since the extra width and height clearances, the pavement and subbase thicknesses, and the added maintenance and administration incurred because of them could be saved if highways were maintained only for light vehicles.

In view of the preliminary findings of the Bureau of Public Roads in its Section 210 study,[5] the indeterminate nature of some highway costs, and the crisis that has beset the railroads, any error in user fees for large and heavy vehicles should be in the upward direction rather than the reverse. The minimum desirable action involves raising the state and federal fuel taxes on diesel trucks and buses to levels sufficiently above the rate for gasoline vehicles to equalize payments by diesels with those by gasoline units for a given amount of highway service. For whatever the long-run marginal costs of supplying highway services to gasoline vehicles may be, they are the same for comparable diesel units where the size, weight, route, and time-use factors are the same. As long-distance traffic is carried preponderantly by diesel units, the shipper cost-raising result would assist shipper choice in influencing traffic to move by the most efficient mode. How large a traffic shift would take place is unknown; but since the effect is toward allocative efficiency, that uncertainty should not delay adoption of a diesel-differential policy such as that recommended by President Kennedy.[6] Since compensation would not be sought for the full social marginal costs, the possibility that gasoline units might sometimes be paying more than long-run incremental costs can be neglected until highway cost causation data make a comprehensive revision possible.

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[5] *Final Report of the Highway Cost Allocation Study,* Letter from Secretary of Commerce, H. Doc. No. 54, 87 Cong., 1 sess., Jan. 16, 1961, p. 27.

[6] Special Message to the Congress on Highways, Feb. 28, 1961, reprinted in *New York Times,* Mar. 1, 1961, p. 16. A federal diesel tax of seven cents a gallon was suggested compared with the four-cent tax on gasoline.

The Walters' marginal-cost pricing rule is indefinite as to user fee adjustments for over-the-road transport. His suggestion that fuels taxes be reduced in rural areas might imply that user fees would be lessened or abandoned for intercity movements where highway space is not congested. But extreme care would be in order so as not to adjust fees below the long-run marginal cost of supplying the special features of highways required only by the big vehicles. Fee reductions to promote fuller use should be applied only at locations and during times when excess capacity is significant and demand is price elastic. As with urban highways, marginal-cost pricing also would raise fees on congested main highways, or at times of congestion, to bring private marginal cost into equality with social marginal cost. Tolls supplementary to user fees in these cases would contribute efficiency in resource use.

The most questionable aspect of the marginal-cost pricing rule for main rural highways is its rejection of user fee revenues as tolerably economic guides for investment and as a check calculated to avoid wasteful investments. An outstanding merit of the American coverage-of-total-costs-with-user-revenues criterion is its successful financing of the most pressing highway needs. The accomplishment of modern toll roads in this respect strikingly exceeds that of the "free" highways financed from fuels taxes and registration fees. Whatever disadvantages the revenue-coverage policy has, it has not failed to attract huge capital sums to highways and to particular roads having the greatest traffic pressure. Granted, user fee financing and political apportionments also have resulted in overinvestment in some highways, underinvestment in other roads, and probably in overinvestment in the highway function. But allowing for the time factor in modernization and for political apportionments, conventional user fee practices have contributed an enviable modern highway system in the United States. Notwithstanding, the toll road method proved distinctly superior to such system-wide user fees as gasoline taxes and registration fees in producing much-needed super highways quickly and at the best locations.

User Fees for Roads in Underdeveloped Countries

In underdeveloped countries, a real danger exists that too low user fees will be charged because little congestion occurs on main highways and because of the amazing assumption, often implicit in marginal-cost pricing advocacy, that heavy-duty highways already are in existence. Underdeveloped areas typically have a well-developed railway system for the major routes but a highly deficient main highway system in terms of modern standards. And because of poor roads and low per capita incomes, passenger car use is low and does not comprise the chief urge for modernization of main highways. Rather the growing use of trucks and buses and vested interests press for expenditure of vast sums for improving such highways to modern standards. But since heavy-duty highways have to be created for the first time and modern roads suitable for light vehicles might not be constructed for some time, the low user fees of marginal-cost pricing would risk a gross waste of scarce resources in the case of the long-distance highways parallel to the railways.

In Nigeria, the long-term marginal cost of operating the largest trucks used is about triple that for railroading without including adequate user fees.[7] As in the United States, long-distance trucks are operated under a rail rate umbrella based on value-of-service rates. Hence, the large expenditures for developing heavy-duty roads for long-distance trucking could more efficiently be spent on feeder and land access roads,[8] for constructing heavy-duty roads in areas devoid of railways, or for modernizing and extending the rail system.

User Fees for Inland Waterways

Tolls were characteristic of nineteenth-century canals until displaced as profitable enterprises. Nevertheless, modern domestic waterways have been toll-free for decades. The barge lines, communities on waterways, and shipper groups using barge transport are opposed to tolls, even for recovery of recurrent costs of lockage and dredging. They contend that tolls would markedly reduce waterway use and that tolls are unnecessary because everyone benefits from cheaper transport and goods. In addition, they anticipate that subjection of claimed benefits to effective demand would reduce the benefit-cost ratios for validating investment in new waterways and in projects to deepen and widen the old.

The marginal-cost pricing divorcement of investment from revenue-generating possibilities is clearly of no aid in preventing wasteful investment in waterways. Wasteful investment reflects attention to social surplus criteria rather than to revenue possibilities in justifying investment, and it prevails despite the nonexistence of pricing restrictions on use. Hence, the revenue-coverage criterion would yield superior results in terms of the capital-limitation function of prices. The complication of multiple-purpose dams for cost determination is less difficult than the common use of highways. Indeed, all investment costs of canals around dams and of locks, together with annual maintenance and operating costs, are traceable directly to the demand of water carriers.

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[7] Stanford Research Institute, *The Economic Coordination of Transport Development in Nigeria,* Feb., 1961, pp. 4-10 and 180-87.

[8] E. K. Hawkins, "Investment in Roads in Underdeveloped Countries," *Bul. of Oxford Univ. Inst. of Statis.*, Nov., 1960, pp. 359-69.

Manifestly, on this ground alone, tolls, which have been found feasible for waterways by the Department of Commerce,[9] are indicated for promoting greater allocative efficiency. An additional ground is that barge lines have diverted substantial traffic from railroads without the need for shippers to bear recurrent waterways costs. Much diversion would have occurred even with tolls covering incremental costs, as the unit costs of integrated-tow services on dense-traffic waterways before user fees are far below rail costs except under favorable loading conditions. Nevertheless, it should be tested in the market whether shippers would continue to ship the same volumes at rates covering tolls which recover recurrent costs of old waterways (or day-to-day expenses of projects marked for eventual abandonment) and long-run marginal costs of new projects. On grounds of social economy, no objection could be validly raised if such minimal tolls should shift substantial traffic to railroads or pipelines or even should close marginal waterways.[10]

User Fees for Airways and Airports

The airways also have a congestion problem. As with highways, congestion is oppressive in terminal areas. Likewise, large public investments are advocated to handle growing air traffic and jet technology. Airlines, too, have diverted much traffic from railroads; and as in barge transport, diversion has not been limited by full market tests of relative economy. Explicit user fees have not been assessed. However, the tremendous speed advantage makes it unlikely that higher air fares from complete user pricing would redivert much traffic except in shorter-trip markets. Even so, nonrational air-surface carrier traffic divisions may exist and might become serious as air cargo develops.

The annual costs of maintenance and operation of the airways are importantly recurrent. With investment expenditures rising, long-run marginal costs of maintaining the airways are significant and are traceable to military, civilian, and commercial airline users. Hence, unless user fees at such cost levels are charged, there are neither airway pricing restrictions on overuse of limited air space nor on pressures for investment in improved facilities. Nor is output expansion adequately tested by fares or private flying costs that cover the airlines and civilian users' shares of huge government costs for airway services.[11]

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[9] Department of Commerce, *User Charges on Inland Waterways,* Jan., 1959, pp. 41-46 and 48.

[10] In a memorandum to the writer, dated Dec. 4, 1961, Professor Marvin J. Barloon estimated that tolls to recover annual costs of waterway maintenance and operation plus capital charges would amount to 1.68 mills per ton-mile, or a barge cost increase averaging 42 per cent and ranging to 56 per cent on coal and grain and 84 per cent on petroleum, with tolls to recover maintenance and operation only presumably having about one-third as much cost-raising effect. Considering alternatives, Barloon thinks full-cost tolls might depress barge traffic by 50 per cent and force closing at least the high-cost and lightly-used waterways. The effects of minimal tolls covering recurrent costs were not specifically estimated.

Evaluation of marginal-cost pricing for airways is complicated by political factors that promote great air-facility investments whether or not fully justified by economic factors. However, the constraint of airway user fees at long-run marginal cost levels, and possibly equated with social marginal cost at times of congestion, might give priority of scarce air space to common carriers handling massive traffic movements efficiently. Such pricing might also limit less justifiable capital expenditures. The cost elevation for air transport services, accomplished by equating carrier costs with true economic costs, would influence users to make more economic choices between modes. The burden of airway user fees on the airlines could be eased by gradual adoption of adequate user charges.

User charges for airports are universal. However, user fees and other revenues have not made commercial airports self-sustaining, nor have airports borne the general taxes levied on railway and bus terminals. Congestion often occurs at principal airports, and expanded facilities, even two or more airports per city, have been required. Consequently, long-run marginal costs cannot be assumed to be low. For that reason, to attract capital and to shore up traveler and shipper choice in rationally dividing traffic, higher user fees are indicated for airports.

Conclusions

Public transport policies are being tested severely by unending urban highway congestion, by growing congestion in available air space, and by the deepening crisis in the railroad industry. While American transport is enviable, some facilities have been overexpanded, too much traffic moves over high-cost modes, and the low profitability of common carriers does not reflect their economic role. User fees and standards of public investment are not solely to blame—the pricing of carrier services, restrictive regulation, and inequitable general taxation all must be held to account. More efficient transport will require advances on all policy fronts. However, the greatest need is for cost-based competitive pricing of carrier services and universal and more adequate user pricing for government-facility services.

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[11] The federal government's rapidly rising expenditures for airways, airports, and other facilities or services for air transport, and the very small percentage recouped from user charges, is shown by Robert C. Turner, Assistant Director, Bureau of the Budget, in "Aviation Expenditures and Taxation: Some Key Questions," Symposium on "The Issues and Challenges of Air Transportation," Hartford, Conn., Nov. 3, 1961.

With many pressures for such policies, re-examination of basic pricing criteria is advantageous. The marginal-cost pricing criterion can be helpful to the extent it stimulates an economic use of existing public facilities and as between all modes of transport. To the extent it assesses all money and social costs of highways on users and on the right users, it will strengthen shippers' and travelers' choices in rationally allocating traffic between alternative facilities and modes. It points to low initial tolls on existing waterways but perhaps to high user fees on airways and airports where congestion is serious. On the other hand, the loosening of all constraints of user revenue coverage of total costs on wasteful investment under the marginal-cost pricing scheme would work against a more efficient resource allocation; and it has yet to be shown that sufficient investment in economically-justifiable public transport facilities could be assured without the revenue-coverage criterion. Hence, some combination of marginal-cost pricing and revenue-coverage policies would seem better adapted to creating an efficient role for highways and other public-facility transport modes than either criterion by itself.

THE MERGER MOVEMENT IN TRANSPORTATION

By Kent T. Healy
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The merger movement in transportation currently centers on the common carriers within the three fields of rail, truck, and air transport. These three represent industries each of which can be classed as imperfectly competitive, along main channels of commerce most often in the ologopoly range but generally monopoly in less intensely developed parts of the country. The behavior of firms in all three fields is conditioned to a high degree by institutional arrangements ranging from the varying controls of government regulation to those of private pricing associations, and providing to various degrees control of entry and exit, pricing and output of firms.

Each of the three modes of transportation has a surprisingly wide range in size of firm. The following table shows the size distributions in terms of the 1959 revenues of interstate independent railroad systems, scheduled airlines, and motor truck companies with above $1,000,000 annual revenue. In the case of trucking there are a large number of still smaller companies producing a significant proportion of the total industry revenue.

Annual Revenue	Railway Systems	Airline Companies	Trucking Companies
Over $500,000,000	5	—	—
200 to 499,000,000	12	4	—
100 to 199,000,000	9	2	—
50 to 99,000,000	12	5	5
10 to 49,000,000	16	7	97
1 to 9,900,000	47	7	793

This diversity of size of firms is in part accounted for by their historical development, since operations have usually originated as small units which have grown by merger and extension. The extent of growth has been affected by regional differentiation due to political, economic, and social diversities, and by barriers created by the country's physical geography. In addition, diversity of size grows out of the fact that there has been operational advantage of different sized firms for different needs. There have not been economies of scale or market advantages so strong as to force a single pattern of fully national scale firms or, except for airlines with their long hauls, anything even approaching this.

The institutional factors which loom so large in the performance of transportation firms are varied. An important part of government regulation is aimed at the limitation of entry into markets. For both the railroads and motor carriers of general freight, new entry into major channels of commerce has in recent years been generally prohibited. With air carriers the regulatory agency has had varied policies and has even recently allowed entry by existing firms into major channels. The other side of the picture appears in the varying restrictions on withdrawal from markets. These are most rigorous in their effect in the railroad field with federal control of total abandonment, and state and sometimes federal control of passenger service reduction. On the other hand, freight train service is freely adjustable.

Limitations on individual company pricing have, in the case of both railroads and trucks, come from their respective regional carrier price associations, and from government regulation. The control procedure in the private price associations has probably been critical because it is the initial check on price changes and most all rate changes are subject to it. Subsequent government regulatory action, though important by way of setting standards and in critical situations, occurs in a relatively small proportion of individual rate proposals. These constraints make price behavior quite different from ordinary oligopoly situations.

The over-all economic performance, leading up to the merger movement may be summarized in the only index available for comparing all three modes in 1940 with a recent year. For the trunk airlines in 1940 the net operating income before income taxes (the difference between revenue and the items of expense, rents and other taxes) was 7½ per cent of their revenue; in 1960, it was 2 per cent. For Class I truck companies the corresponding figures were 4.4 per cent and 2.0 per cent. For Class I railroads as a whole the proportion dropped from 17 to 8 per cent, with important regional differences, since for the western and southern roads the decline was about 35 per cent, while for the eastern it was 88 per cent.

While trucking and air transport may be called growth industries during the immediate past two decades, railroads could be so-called only in respect to freight traffic in the West and South and not at all in the East. But regardless of relative growth, the financial situation of all three modes has shown substantial deterioration recently, providing an important common element in the current rush toward mergers.

The hope that mergers may solve the financial troubles of carriers is based on the opportunity provided to eliminate parallel routes and terminal facilities. The significance of the contribution which mergers may make through thus improving density of traffic depends to an important extent upon the level at which most of the economies of density are obtained. For railroads, it is clear that starting from very low densities the economic gains with increased density are great but that there are ultimate limits. The author's recent study [1] of the economies of density and scale suggest that in terms of 1954-56 data the optimum levels of density have in practice been reached at a $50,000 system average annual revenue per road mile, corresponding to about 3,000,000 annual freight net ton-miles per mile. These system density levels were exceeded by most of the eastern and the two largest western railroad systems.

The H. H. Copeland density charts for each of the major railroads provide a measure of density, section by section, for each major railroad, so that main-line densities can be separated from branch-line, thus providing a refinement upon the system density measure. The levels of main-line density for the eight most profitable railroad systems in the country, excluding predominantly coal and industry related carriers, ranged between just under 4,000,000 to 5,000,000 net ton-miles per year in the direction of heaviest traffic for the early fifties, the period for which the data are available. If the railroad networks of the country are viewed from the point of view of a density test of this latter sort, some significant observations can be made. A look at the magnitude of flows along some of the principal channels of commerce suggests the extent of possible economies of density by reducing the number of main lines through merger or joint use. In respect to crossings of the Sierras and Coast Range in the West, the two southern and two middle railroad crossings were all above the 4,000,000 level in the direction of heaviest traffic. On the other hand the three Puget Sound routes were well below. In fact, the traffic of all three together barely exceeded the 5 million level. As for Rocky Mountain crossings, the southern and middle routes all met the criteria and again the northern three failed to meet it, but together they had enough for two routes just above the minimum. In the Prairie region the variegated pattern of system main lines is so complicated as to defy summarization, but some highlights are indicative. None of the main routes east from Denver anywhere nearly met the minimum density. Only half of the main lines east of a line going from St. Paul to Omaha to Kansas City met it, several falling far short. On the other hand, of the nine main routes going east of Chicago all but two did. In the South along the line of the Tennessee and North Carolina northern state borders over two-thirds of the nine routes met the test, the rest having been not far short. In the North, crossing east-west in Pennsylvania and New York States, all but two of the main lines carried 8 million or more net ton-miles per year in the direction of heaviest traffic. In general it appears that the clear-cut gains from reducing parallel main lines by means of merger lie principally in the area between the Rockies and the Mississippi River and in connection with the transmountain routes in the Northwest.

The desirable number of main-line routes presents other issues than economies of density, for the over-all social and economic development of the country's resources requires a certain breadth of distribution of first-class transportation service over potentially developable regions. The tendency for the economies of density to be achieved at not unduly high levels of density in connection with railroad freight service provides the opportunity to continue a reasonably widespread coverage, if that service is not burdened with first-class passenger service requirements. The historical development of main lines has in certain areas provided a far denser coverage than the economies of density justify, particularly the Prairie and Midwest states. The process of merger can and should steer a middle course of liquidating the historical accident of uneconomic parallelism without depriving large areas which have economic potential of main-line service.

There is left the whole problem of branch-line economies where it is clear that operations are generally at densities far below those needed for optimum efficiency. Over-all economic data relating to branch-line operations are unavailable. The varying productivity of branch lines is suggested by comparing carloads terminated and originated per mile of road in different parts of the country. For 1959 the annual carloads per mile of road for North Dakota was 54, for Texas, 188, and for a heavy industrial area, Ohio, 485. These contrasts suggest the need in some regions to increase density in this aspect of railroad operations. It is not clear that mergers are any solution to the problem. There is no assurance that a merged system will be permitted to abandon branch lines any more than its previously independent constituents. In fact the political pressures might point in the opposite direction because a rationalized system, because of supposed gains of merging, might be expected to absorb the high costs on branch lines more readily.

The counterparts of these railroad main route and branch- or feeder-line density problems are to be found in the airline industry. The problem of what minimum densities are required to reach optimum unit costs is complicated, for instance, by wide ranges in stage length and their greater influence on costs. Currently the change over to jets has obviously moved the position of the minimum desirable densities for long-haul main routes. The branch-line problems have been to a considerable extent kept separate from the main-line operations by the fact that local carriers have been kept distinct from the trunks. The latter do not have to provide an internal subsidy for the branch or local line as do the railroads. Studies have not as yet made clear what main route density levels can be counted on to give lower unit costs with the new technology.

A second aspect of the merger movement is the expectancy that the creation of larger scale firms will achieve economies of scale. However, empirical studies of transportation industries in recent years have cast doubt on the extent to which economies of scale continue without limit with increasing scale. A study of railroads by the author [1], after accounting for economies of density and other variables, concludes that the diseconomies of scale in respect to over-all expenses and investment are significant with firms of 20,000 or more employees. In the case of the very largest firms the diseconomies more than offset economies of density. An analysis of railroad cost functions by Professor G. H. Borts [2] (dividing firms into three size groups, the smallest ranging from the Minneapolis and St. Louis to the Monon, and the largest from the Pennsylvania to the Rock Island) states that "it is clear that the minimum point on the plant average cost curves for the largest size of firms in the East is above the minimum point for the smallest size of firms. For the South and West . . . either the average cost is highest for the smallest firms or else . . . doesn't vary by size of firm." For the latter two regions the difference between the middle and the largest size firms is not over 3 per cent.

In the motor carrier industry a sample study of 114 firms by Professor M. J. Roberts [3] concluded that "the evidence . . . establishes the absence of economies of scale. . . ."

For air transport, studies of scale economies have reached similar results. Professor H. D. Koontz [4] concluded that "there are few economies of scale beyond the size of these airlines which have been classed as medium small" and later Mr. S. Wheatcroft [5] in his study of American carriers in reference to European airline questions summarizes in the terms, "economies which follow from large scale operations begin, after the medium scale of operations is reached and the major economies have been achieved, to be offset by the diseconomies of scale. . . ."

Analysis of more recent trunk airline data, for 1956–60, confirms these conclusions. The "big four" trunk carriers, compared to the smaller trunks, show no decrease in proportion of total expenditures going for either of the two categories of expense, "general and administration" and "promotion and sales," where scale economies might be expected. In terms of total expenses per available ton-mile, the average for the smaller trunk group is slightly lower despite its shorter haul and lesser route density.

The merging of carrier firms into larger units is presumed to carry the economies of density and scale into improved financial performance. However, general view of the variation in two basic indices of that performance with size of firm does not support that presumption. The following table shows three- or four-year averages of (*a*) the proportion of revenue carried through after expenses, rents, and taxes other than income, and (*b*) the return calculated on the most nearly comparable available book investment bases.

Of the railroads, the largest scale group has the poorest showing and the next to smallest scale group the best, as they did for the 1954–56 period of the author's study referred to earlier. If the western railroads alone be considered, in order to provide more homogeneous group composition, the same ranking is to be found. In both cases this is true in spite of the fact that the large-scale groups have at least a 35 per cent higher average density of traffic and even greater advantage in length of hauls. For the trunk airlines the medium and large groups show no significant difference in the two indices despite the more favorable length of hauls and density for the larger scale group. For motor trucks, again the middle-sized groups, within the range presented, showed the most favorable results. For each mode, all the largest firms are the result of past mergers made with the purposes of increasing financial strength by improving control of markets, increasing density, obtaining longer hauls and reducing interchange, and gaining possible economies of larger operation and better utilization of facilities. Yet at the largest scale levels the financial results suggest that diseconomies set in to offset other gains.

RAILWAY SYSTEMS† 1957–60			TRUNK AIRLINES 1957–60			MOTOR CARRIERS OF GENERAL COMMODITIES 1957–59		
Size in Annual Revenue (Millions)	Net Operating Income* / Revenue	Net Operating Income* / Depreciation Book Investment	Size in Annual Revenue (Millions)	Operating Profits* / Revenue	Operating Profit* / Depreciation Book Investment	Size in Annual Revenue (Millions)	Net Income* / Revenue	Net Income* / Tangible Investment
Over $400 (6)	8.0%	3.2%						
$180–400 (9)	11.3	3.9	$400–200 (4)	4.6%	6.2%			
$100–179 (8)	8.7	3.5						
$50–99 (9)	13.3	4.7	$50–150 (7)	4.8	6.5			
$20–49 (8)	11.3	4.0	under 40 (1)	−17.5	−22.0			
						Over $40 (5)	4.2%	10.1%
						$30–39 (5)	4.2	10.5
						$20–29 (6)	5.0	12.3
						$10–19 (53)	5.3	12.0
						$2½–10 (268)	3.0	7.4

NOTE: Parentheses indicate number of systems or companies in size group.
* Before income taxes.
† Excluding predominately coal and passenger carriers and industrially related companies.

A potential effect of mergers is their influence on price behavior. In the case of railroads and trucking, the existence of rate and fare associations with their essentially collusive environment makes the reduction in number of firms through merger important. This is given particular significance by the severe restriction of new entry into markets. There is also particular emphasis on the oligopoly characteristic that a rate reduction a firm makes will be met by parallel carriers and also by other even remote carriers transporting the same commodity to common markets or from common sources.

In the past, with railroads as the dominant freight carriers, the oligopoly structure together with the association rate-making procedure and regulatory supervision led to rigidity and discrimination in rate structures. Competitive effort was directed to service and salesmanship as the means for a firm to improve its position. For some types of traffic this is still the general situation, but the advent of trucking and inland waterway competition has placed emphasis on price as a determinant of market share for much traffic. The result has been far more independent action by carriers, more experimentation with pricing, and a tendency for prices to conform more nearly to costs, despite the continuing existence of associations and regulation. It is open to question whether this situation will continue indefinitely. With a new industry like trucking the individualism of the original owner-operators of the many firms has provided maximum flexibility in pricing, but with more mature and larger firms the chances favor a more conservative approach and increasing likelihood of rigidities. New techniques of transportation such as piggy-back service also have produced variety in pricing, but the effects of these will tend to wear off with time. These trends, together with current pressures to stabilize pricing in order to improve the financial situation of carriers, make it important to consider the long-run implications of mergers on the whole pricing procedure.

Obviously mergers tend to reduce the number of firms interested in particular markets and the prices relating thereto. This lessens the chance of any one among the few in the market pressing for price revisions as a means of promoting particular traffic. Further, as small companies are merged into larger ones resulting in more general and uniform competition with each other, the implications of a downward price change would have a more uniform and direct impact on all, thus further discouraging independent action as a means of improving a firm's share of the market.

Mergers, because they tend to build up firms representing great concentration of control over service, create situations more conducive to larger firm dominance over the give and take of association rate procedures. The pressures that can be exerted by such dominant members against independent and experimental price adjustments are very real. Since inevitably members must join with one another in making joint through-rates over routes involving more than one member, there exists considerable pressure to work harmoniously, particularly with the large company with which most joint rates are likely to be made. The reduction in the numbers and relative strength of medium-sized companies would remove an important offset to rigidities and monopolistic aspects of rate structures. The local firm tends to be more intimately concerned with and sympathetic to local possibilities than a large seminational firm with vested interests in such a wide variety of situations that the *status quo* for the whole seems better than the possibility of small gains in a local situation.

The risks are great that a general merger movement, by eliminating strong-, medium- and small-sized firms from, or weakening their participation in, rate-making processes would remove an important protection for the economic community against failure of carriers to pass on to it the advantages of new technologies and to make reasonably rapid adjustment to changing locational factors.

The creation by merger of very large firms and correspondingly large concentrations of economic power raises other questions. For instance, in the East the largest railroad merger under discussion would encompass over one-half of that region's service, as measured by revenue. The risk of having as large a proportion of service subject to stoppage by local strikes of the kind experienced in the last few years is hardly to be knowingly incurred unless there are very substantial offsetting gains. With over 1 billion dollars outstanding funded debt for a single system the hazards to the general financial institutions of the country in case of bankruptcy would be great and might result in more than just temporary federal participation in the country's railroads. Finally, the concentration of a high proportion of a transportation industry in single or but few hands removes one of the essential aspects of private enterprise as the ordinary customer conceives of it; namely, the opportunity to choose among firms for optimum service and price and the expectancy of a variety of management approaches to innovation and service. The combination of these disadvantages with the inevitable bureaucratic tendencies of the largest scale railroad companies can lead to a "public image" of the industry not too different from that of a government operated one. There is a real hazard that the merger movement carried to a high degree of concentration may be a factor in bringing about nationalization of railroads.

It is clear that there are numerous aspects to the merger movement. A clearly positive one is the increasing of traffic density, though there are limits to the gains obtainable in this direction. It should be added that arrangements for joint route and terminal use by firms remaining separate offer another workable and significant way of obtaining the economies of density. The negative aspect of diseconomies of scale with the largest firms is one which needs to be taken more seriously in view of the general agreement in over-all empirical studies that there are diseconomies or lack of further economies of scale beyond certain limits. Mergers which involve very large concentration of traffic in single firms or elimination of smaller firms in a given region raise serious doubts as to the maintenance of acceptable price behavior in the unique institutional setting of price associations and governmental price and entry control. The substantial reduction through merger in number and relative strength of medium-sized firms will restrict the opportunities for variety in management patterns, technical innovation, and market adjustments. This means fewer opportunities for individual initiative and more rigidity in allocation of resources. Finally, there are a variety of hazards in the extreme concentrations of economic power possible with some of the larger merger proposals in the railroad field.

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DISCUSSION

MERRILL J. ROBERTS: Professor Healy has made it abundantly clear that there are two sides to the merger question. He is commendably cautious regarding the merger cure for transport financial problems, indicating that opportunities for economies are highly limited and that mergers produce undesirable service and pricing patterns. Unhappily, his optimum density level for railroads is exceeded by most of the eastern companies, indicating little help from consolidations in coping with the growing railroad crisis in this area.

But his limits on attainable economies may be too narrow. Aside from biases which innocently creep into complex density-scale analyses, it is questionable that such analyses are completely relevant for anticipating merger economies. While predicting cost effects if a particular company gets bigger, they do not fully reflect fundamental improvements in production methods uniquely resulting from merger.

Illustratively, railroad mergers are associated with "rationalization." Merged properties would slough off marginal facilities and concentrate traffic on more efficient plant components, yielding significant economies not reflected in generalized scale analyses. Furthermore, consolidation permits more efficient operating patterns, such as reduction in the waste of circuitous movements and of empty car mileage. Also important is the reduction of cost-increasing service competition between railroads, such as the adoption of a pattern of schedule frequency which precludes the operation of optimum-size trains.

Furthermore, Professor Healy may also overstate the drawbacks of consolidation. There is substantial evidence that competition between railroads has been singularly barren, failing to produce true cost-reducing innovations such as have been forced by interagency competition. Accordingly, the advantages attributed to railroad competition (e.g., better service and lower rates) reflect largely differential rate and service policies and not true efficiency advances. With given technology, quality differentials like greater dispatch, frequency, and expedition are achieved only at a cost. If provided in competitive but not in noncompetitive situations, and if rates are not differentiated accordingly, the advantages of those favored by superior service are achieved at the expense of others who must help to pay for it. The benefits do not arise from competition per se but from its unevenness. They are not net of costs to others and so represent no real social gain. The restriction of shipper choice of rail routes is important for specific private interests but a doubtful matter for social concern.

Professor Healy may also view too darkly the adverse pricing effects of railroad mergers. He correctly recognizes that historic railroad pricing was characterized by rigidity, discrimination, and anemic price competition. As he says, the advent of nonrail competition has occasioned the desirable emphasis on price competition. It is not apparent that these two propositions add together to cause genuine concern about any serious deterioration in pricing patterns from railroad mergers.

The dangers of adverse social effects in pricing can be much more intimately traced to government policies regarding public facilities and regulation, matters covered by Professor Nelson and Mr. Arth. Professor Nelson clearly points up the conflict between a strictly marginal-cost pricing system and one calculated to provide complete financial recovery. Despite its theoretical appeal, he soundly declines to embrace the former. The case would be quite different if marginal costs and prices were commonly equated in the economy generally; in the face of widespread indivisibilities, however, they clearly are not. It is tempting to take advantage of the unique opportunities afforded by government investment in commercial-type enterprises such as highways to pursue the theoretical niceties offered by this pricing formula. But this makes a relatively small contribution to efficiency in terms of total resource use. On the other hand, as Professor Nelson recognizes, it is apt to introduce offsetting inefficiencies which are concentrated within the transport sector of the economy and thus may jeopardize the private segment of that sector. In doing so, it fosters not only inefficiencies but inequities.

For these reasons some judicious compromise between the marginal-cost and full-cost recovery approaches that embraces the former as an equal partner has serious drawbacks. Cost recovery should, rather, represent the basic approach, with departures for special circumstances as a special case. Only in this way will facility-use prices square with those in the economy generally and avoid the maladjustments stemming from misguided investment predicated on political rather than economic criteria.

I was struck by Mr. Arth's observations regarding the general agreement in the transport reports reviewed on major economic objectives, but not on implementation. Perhaps this diversity is less a reflection of the extreme complexity of the economic issues involved than of a general failure to probe the tap roots of the question, "What is really wrong with regulation?"

Revisions of the kind suggested are indeed needed in the substantive content and appurtenances of regulation. But I see an even greater need for a searching re-examination of its fundamental premises and goals along these lines:

1. The validity of the underlying premises of the new (post-1920) regulation. A review of the major features of this regulation suggests that its premises are as follows: (*a*) private management is incapable of making self-interest decisions in competitive situations which will maintain the financial integrity of their own or other transport companies; (*b*) such faulty decisions are sufficiently contrary to the public interest to invoke the presumption against control inherent in our social system; and (*c*) regulatory processes are capable of remedying such defects. Have these premises really been established? In answering this question, it should be noted that managerial perfection is not required for the successful functioning of the transport system; it is never achieved in nontransport businesses; yet the economy functions adequately.

2. The ability of its institutions to foster its objectives. We employ regula-

tion for purposes quite incompatible with its essential character. It is expected to serve promotional ends; yet it is essentially a negative and restraining institution, highly capable of preventing, but an inefficient means for producing, certain results. Realizing such positive goals requires means that are more strictly planning in character and entail a more complete stifling of market forces and managerial functions than has yet been contemplated.

3. The relevance of its goals. The protectionism that is characteristic of present regulation may itself establish an environment of financial stringency. Introducing inefficiencies in traffic allocations, investment decisions, and operating patterns, the market balks at providing financial support adequate to cover the inflated costs. The forces of regulation as presently marshaled are impotent to induce full financial support. The alternatives are more comprehensive government programs of support or the formation of a transport system consistent with market dictates.

If we are on weak ground in these respects, uncertainty as to the means to achieve an efficient transport system through present regulatory concepts is inescapable.

DUDLEY F. PEGRUM: I have not had the opportunity of reading all of the papers in advance; I shall therefore accord to myself the privilege of pointing out some considerations that seem to me to be of special significance in the development of public policy for transportation.

Proposals for federal control of transportation range all the way, at the present time, from subjecting the agencies only to antitrust, to a more thoroughgoing regulation in the public utility pattern than now obtains. The theory of those who hold to the antitrust approach is that competition is so pervasive that regulation designed for a basically competitive system is wholly adequate. This point of view, however, fails to recognize that transportation consists of a group of industries not all of which are amenable solely to competitive controls. Few would seriously advocate that railroads should be permitted to extend their lines into new territories without restriction; consolidation under antitrust would lead to endless litigation; and problems of interagency ownership under antitrust alone would saddle the courts with the development of policy without any criteria for decisions.

Common carrier responsibilities have always been a unique characteristic of some transport activities. In this country, they have developed especially around the railroads and are embodied particularly in the Interstate Commerce Act. If this were repealed, there would be no workable basis at federal law for enforcing these obligations in interstate commerce. The result would be thoroughgoing confusion and endless litigation. To endeavor to remedy this by retention of the features of federal legislation pertaining to common carriage would push matters back perilously close to the point from which the retreat began.

There is much emphasis today on the need for protecting the common carrier, on the ground that it must constitute the backbone of the transport system. That the common carrier is essential in many phases of transport cannot be denied, but that it needs to be protected against competition is a *non sequitur.* If common carriage is necessary, it will pay for itself, provided that noncommon carriage is not given aid and privileges denied to the common carriers. It is claimed that because common carriers have to assume special obligations they must be protected against those who may take the business without assuming the same responsibilities. If the service performed and the obligations assumed are worthwhile, shippers will pay for them. I see no reason why those shippers who do not wish these services should be compelled to accept them in order to support those who do.

The present concept of common carriage developed with the railroads when they were almost the sole supply of land transport. They became complete common carriers and common carriers only. This idea has been extended to the other agencies with, however, the distinction between those that are common carriers and those that are not. Present-day competition has removed the need for such differentiation. I see no reason why carriers should not be permitted to engage in both noncommon carrier and common carrier transport. Common carriage relates to the obligations assumed and does not extend beyond them. To argue that to permit carriers to engage in both kinds of transport will lead to discrimination must mean that a shipper who is able to take advantage of contract carriage, or supply his own, is the beneficiary of discrimination against the one who relies on common carriage. Furthermore, there needs to be no presumption that common carrier prices must be fixed by public authority. This is the result of earlier development of the railroads, not of the common carrier concept.

Competition in transportation today is of two types: (1) that which exists among the various modes and which affords to shippers alternative means over a wide range; (2) competition among the carriers of the particular agencies. Interagency competition presents the problem of the appropriate basis for minimum rates on traffic which may be moved by any mode; intra-agency competition, that of the proper basis within the modes. If all agencies had the same economic characteristics, there would be no need for making the distinction. Motor, water, and air transport are thoroughly competitive in their economic structures. Regulation simply cannot force them into the public utility mold. Concern over illegal transport, labeled the "gray" area, arises from the desire to limit the competition faced by the common carrier. A more promising approach would be to accord more leeway to the latter. Price regulation for the competitive agencies can be no more successful than attempts to regulate the precise prices of industry in general.

The railroads present another problem. They have a relatively large fixed and specialized investment, as evidenced by the slow turnover of capital, together with a concomitance of production and consumption. In other words, they have the same characteristics as public utilities which cannot stand overall competition. Railroads are more complex because a considerable amount of competition among them cannot be avoided unless there is a single system for the entire country. Their economic characteristics have not changed with the new technology and the new transport structure. What has changed is the alternatives available to the consumer. Apart from the economical minimum below which rates should not fall, as a matter of good business and sound economic policy, the market can be relied upon as the economical arbiter.

Economic theory recognizes that fixed costs are not "economic" costs and that joint costs cannot be traced. The relevant costs, therefore, for the pricing of particular services are the specific and variable costs. This is not unique to railroads; it is the same for all enterprises. The difference arises from the wider spread between relevant and average costs for railroads and those of industries whose structure is competitive. Of course, if enterprises are to stay in business, long-run marginal costs must be covered, but these do not include those things which do not have to be renewed, nor those resources which lie idle as a result of pricing which precludes their use. When the long run for industries like railroads is fifteen years or more, shorter run considerations can scarcely be avoided.

The careful application of price theory to transportation today will afford ground for supporting much less restriction on pricing than prevails at present and much less restriction on competition. Too much of what goes under the name of transport economics is at variance with accepted economic theory. If the theory is valid, it should be applied. If it is not, then the economists who hold to this view should develop a systematic corpus of theory that is valid and applicable. A sound national transportation policy based on economical allocation and utilization of resources will not come from uneconomic reasoning.

ECONOMICS OF WATER RESOURCE USE

THE POLITICAL ECONOMY OF WATER DEVELOPMENT*

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Problems of water resource development have been the focus of substantial interest to a growing number of economists and political scientists. In both cases this interest unquestionably arises from the multiplicity of uses that can be derived from a water system. Political scientists have either been concerned with describing the game of politics associated with conflicts among the interests involved in water resource development or with the design of administrative arrangements which would assure comprehensive, multiple-purpose planning of water resource programs. The biases of many political scientists have led them to urge an integrated, regional approach to water resource planning. By contrast, economists have been concerned with the appropriateness of market mechanisms for allocating water resources among competing users and with the development of modes of analysis which would assure more explicit consideration of economic criteria in reaching decisions bearing upon water resource developments.

In one way or another, all of this inquiry and speculation has been concerned with the patterns of organization which are appropriate for reaching decisions about the development of water resources in relation to their many potential uses. Few areas of American political and economic experience offer a richer variety of organizational patterns and institutional arrangements than the water resource arena. Yet these patterns of organization have developed in a way that seems to conform neither to the prescriptions of political scientists nor to the prescriptions of economists. There is an extraordinary dirth of integrated regional agencies capable of comprehensive, multipurposes water resource planning and development. This can only be compared with the void of private competitive enterprises which behave like "sovereign" producers in a market economy.

As a result there may be some utility in an effort to enquire about the basic configuration of organization and institutional arrangements

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supplementary water supplies which would then be distributed on a prorata basis among the co-operating mutual water companies. The new company, in this case serves as a supplementary producer and wholesaler to the other companies which function as retailers.

Where other private companies have been organized to provide water supplies for a profit, they have uniformly come under state laws governing public utilities. These laws require a company to secure a license of "public convenience and necessity" in order to engage in a public service enterprise and the rates which they may charge for their services are subject to detailed approval by a public utility commission. Private companies providing water supplies as a public service are in effect limited-profit enterprises.

The public organizations which provide water supplies for consumptive purposes are generally organized according to the principles of the municipal corporation. The municipal corporation is a legal device whereby a local community of people are permitted substantial authority to organize themselves in order to undertake some public function in their own interest. The government of a municipal corporation is usually vested in a governing board or council elected to represent the local population. A municipal corporation is usually vested with authority to enact ordinances, resolutions, and bylaws in relation to its purposes and functions which are binding upon the people comprising the corporation, unless contrary to the general laws of some higher political jurisdiction. It usually has control over its internal administrative organization and the management of its own affairs. It may purchase, hold, and dispose of property. If necessary, it may exercise the power of eminent domain to acquire property for public purposes. A municipal corporation stands as an individual before the law; it can sue and be sued; and it has perpetual succession in its corporate name. In general, a municipal corporation has competent powers to develop, operate, and maintain a public service program subject primarily to local responsibility and control.

A municipal corporation is usually vested with the power of incurring bonded indebtedness to finance capital improvements, of taxation, and of the management of its own fiscal affairs. Presumably those who join together in forming some special district to undertake the development of a common water supply are in a position to make a decision that certain costs and obligations are justified in relation to the benefits to be derived. The usual requirement of popular approval of any incorporation proceedings in organizing one of these special districts places some constraint upon those drawing the political boundaries to negotiate an approximate fit to those who will be beneficiaries of the development. Fiscal autonomy further gives some assurance that the costs of a development will be borne by those who are the proximate beneficiaries. In this sense, the public water district would seem to assure an internal commitment toward long-term considerations of efficiency.

From a beginning with irrigation districts, the special public districts, organized along the model of the municipal corporation or the quasi-municipal corporation, have come to include a vast range of activities related to water resource administration. The early districts were either organized to provide for consumptive, on-the-land uses of water for both rural and urban populations or for land developments requiring the control of adverse water conditions through common drainage or diking facilities. In more recent years other types of districts, such as water conservation districts, water storage districts, water replenishment districts, county water agencies, metropolitan water districts, or county water authorities have been created to develop supplemental water supplies and to undertake new management functions involving joint pay-offs for existing water agencies.

In an area such as Southern California, where the local watersheds involve small, nonnavigable streams, a complex system of private agencies and public districts has developed into an interrelated structure for local and regional administration of water resources. Some are engaged in water production, including surface storage and ground water spreading. Others regulate pumping and control ground water extractions. The Metropolitan Water District of Southern California maintains its Colorado River Aqueduct to provide a supplemental supply for most of the region. Beyond this is a vast complex of private and public distribution systems. Many of these distribution systems may produce a portion of their own supply. Finally, there are thousands of industrial and agricultural users who maintain their own water supply systems largely by pumping from ground water sources.

None of these water agencies operate their water supply and management systems in a way that would conform to a rule for the maximization of short-run profits. Rather their policies seem to be based upon the objective of providing a water supply under conditions that will assure the most favorable competitive position for the continued economic growth and development of the immediate local community which the agency is serving. The pay-off is not measured in terms of the immediate dollar return upon the operation of the water distribution system but upon the adequacy of the reserve supply to meet future contingencies of growth.

Conflict between adjoining communities in Southern California is repressed by the organization of coalitions among water agencies to undertake the joint development of external sources of supply for importation into the region. Joint effort is justified by the participants in terms of the spillover effect which economic growth and development is assumed to bring for adjoining communities in the general metropolitan region. Conflicts over the allocation of the least expensive sources of supply, that give competitive advantages within the region, are usually resolved by adjudication in the courts, by direct negotiation, or a combination of both.

Maintenance of a competitive position favorable to local community development is contingent upon the maintenance of local autonomy or local control by decision-makers within the community. The risks inherent in losing local autonomy or control justify substantial investment in interagency negotiating arrangements among local public districts and agencies. It is better, from this point of view, to settle disputes within the family and to bear the costs for such settlements than to run the risks of centralizing decision making and losing control over local affairs.

Heavy reliance upon adjudication for the resolution of conflict unquestionably reflects efforts to minimize risks of external control by superior decision-makers. In litigation, adversaries define the issues and consequently limit the areas of discretion. The degree of control following a judgment is minimized in adjudicatory proceedings in contrast to administrative methods of control and regulation.

This system of water resource development by local government agencies has had a surprising viability in negotiating and settling conflicts regarding diverse sets of interests within many different community contexts. When new problems have arisen, informal structures have usually been adequate for negotiating arrangements and policies to supra-optimize a new set of values upon the basic value commitment of existing agencies. New management programs and agencies can thus take on new functions with minimal disturbance to existing arrangements.

The task of supra-optimizing in an atomistic structure is unquestionably facilitated by the compatibility of values when all agencies are committed to the absolute priority of consumptive uses over nonconsumptive uses. Market value can ultimately provide a frame of reference for resolving conflict over competing consumptive uses. However, it is most doubtful if this type of structure can deal with conflicting demands between consumptive and nonconsumptive uses except to subordinate nonconsumptive uses.

When nonconsumptive uses of a water system assume significance in water resource development quite different problems are posed for the organization of decision-making and control arrangements. Any effort to affect the output of nonconsumptive, in-the-channel uses of a river system depends upon the regulation and control of the flow characteristics of a stream. The yield of both consumptive and nonconsumptive uses is affected. Thus, river management in relation to nonconsumptive uses tends to affect the relative allocations as between consumptive and nonconsumptive uses and as among the various nonconsumptive uses.

The task of making decisions regarding the relative allocation of water resources to nonconsumptive uses or in making allocations among the nonconsumptive uses is the most difficult problem in planning water resource developments. Reliance upon methods of economic analysis where a dollar value is assigned to public uses is only a partial solution. Since the nonconsumptive uses do not have a directly salable market value an approximate dollar value must be assigned and this assignment of value must necessarily be somewhat arbitrary.

It is entirely possible that the commercial potentialities of the salmon fisheries, for example, have been seriously underestimated. Anadromous fish have a built-in guidance mechanism which takes them to the ocean to pasture and to mature unattended, and then leads them back to spawn in the stream of their birth. It is even unnecessary for people to engage in such inefficient games as salmon fishing when fish ladders could direct a run of salmon to a fish market as easily as they can pass brood stock upstream. If a reasonable portion of the effort that our state universities and agricultural experiment stations have devoted to animal husbandry had been devoted to salmon husbandry, we might find salmon to be an extraordinarily valuable water product which should be given a much more important place in the water economy.

Since economic analysis only provides an approximate evaluation in planning resource developments, attention should also be given to the way that organizations are constituted and related to one another as a political framework for making decisions and exercising control over events. The structure of organizational arrangements implicitly determines the basis for distinguishing the sets of event to be controlled, the order of preferences for ranking the values to be achieved by organized activities, and the standards for determining the relevancy of information to be communicated in the decision-making process. Since the patterns of organization have a fundamental influence upon the development of perspectives, values, and ideas regarding resource policies and patterns of resource development, any question of comprehensive planning must necessarily involve questions about the design of organizational arrangements.

Wherever a single scale of values can serve as a basis for suboptimization, the task of organizing an agency capable of making decisions regarding the allocation of diverse values is a relatively simple one. In this case an integrated approach to comprehensive planning for water resource development is possible, almost by definition. Where there is substantial uncertainty about the order of preference, an integrated organization may simply serve to impose a scale of preferences by virtue of bureaucratic ordering.

If an ambiguous political situation is to be left open, substantial elements of independence need to be structured into the decision-making process, so that those who are concerned with the organization of intelligence and the formulation of proposals regarding different courses of action are free to pursue their interests without constraint. Otherwise, the many different sets of consequences that may flow from different programs of river development cannot be effectively evaluated.

Even the experience of the Tennessee Valley Authority would seem to indicate that the comprehensive development of water resources cannot be organized within the framework of a single integrated agency. The TVA is much less than a fully integrated water resource management agency for the Tennessee river basin. What has been integrated are the dominant values relating to navigation, flood control, and power production. The TVA has divested itself of responsibilities that are primarily related to local communities of interests. Other values related to recreation, fish and wildlife, pollution abatement, etc., are realizable only as other co-operating agencies are willing to co-ordinate their program with the TVA.

In the long-term process, the TVA's experience would seem to indicate that an integrated comprehensive approach to the regional development of the water resources of a river system is apt to become something less than fully "integrated" and wholly "comprehensive." Too many values are at stake in relation to too many different communities of interest. Changing requirements and conditions of life may require modifications in scales of values. If the organization of water resource development is designed to tolerate conflict, then intelligence can be organized and decisions negotiated in relation to the diverse interests involved. Recourse to central decision making is essential only when satisfactory agreements cannot be negotiated.

Even if an effectively integrated organization of water resources development could be attained within the framework of a single regional agency, there still remains the problem of relating water programs as they intersect with other institutions in a political economy that may be concerned with the development of transportation, energy supplies, recreation, rural and urban community life, and a variety of other interests. Furthermore, interbasin transfers of water and hydroelectric power indicate that the watershed basin is not always the appropriate unit for defining interests in water resource development. These transfers point up interbasin, national and international interests of substantial proportions.

Increasing competition for available water supplies will certainly require much greater clarification of the place of nonconsumptive uses in relation to the various consumptive uses of water supply. As changes are proposed in the law of water rights in order to facilitate market allocations of water for consumptive purposes, it is important that consideration also be given to the public interest in nonconsumptive uses. As market arrangements are prefected for the allocation of appropriable goods in the local water economy, improvements must also be made in organizing the articulation of interests and the processing of decisions within and among the diverse communities which share the common wealth in public goods to be derived from the development of water resources. A rich variety of both private and public agencies would seem to be required for the political economy of water resource development.

EXTENSIONS OF BENEFIT-COST ANALYSIS

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I. *Introduction*

The development of benefit-cost analysis has given impetus for agencies to collect data and make analyses leading to serious estimates of the worth of projects. Pressure to refine the analyses accompanying project proposals continues to be an influence improving planning and evaluation procedures. The accomplishments are so impressive that it may be wondered whether methodological improvements are needed.

This paper raises several "Yes, but—" questions about assumptions underlying benefit-cost analysis. The questions lead to tentative suggestions for extensions which aim to do away with the oft-criticized narrowness of usual procedures and still keep rigor to prevent nonsense evaluations.

The ground to be covered in the paper may be briefly outlined. The point of departure is the usual rationale that market valuations are good measures of benefits from project outputs and of opportunities foregone due to project costs. An analysis of effects of various kinds of slack suggests that market valuations may overstate project effects. Even when market valuations are good measures, tracing entire causal chains of economic events ensuing from a project gives a more concrete picture of the situation *with* and *without* the project than does a summary benefit-cost ratio. This helps to indicate effects on variables other than real national output that are relevant to project choice.

Benefit estimates related to consumer surplus may be appropriate for unique or irreplaceable assets. Accordingly, a way of approximating the area under the demand schedule for park services is described. A stated national resources policy could help to take account of values not reflected in user demand schedules. Part of the policy could be a scoring system for the nonmarket effects of projects.

Instead of trying to maximize present satisfactions, policy-makers might choose interest rates to secure the investment mix for a given expenditure that is most conducive to growth of national income. This aim suggests using low interest rates. A simple and attractive way of allowing for uncertainty may be to vary time horizons with type of investment.

Comprehensive river basin planning should proceed from individual project evaluation to a check list for interdependence among projects. The check list should be used in scheduling construction of projects.

II. *What To Do About Fiction in Economic Evaluations*

Do accepted methods of estimating benefits and costs provide a conceptually accurate procedure for measuring the change in national output that would result from a project? Moreover, even if the change in national output is measured correctly, how well does this take account of effects of the project on people's satisfactions? Answers to these questions are usually among the assumptions of evaluation procedures. It may be useful to view the answers as being open to inference.

Problems of estimating project effects may be illustrated by referring to the proposed Garrison Diversion Unit. Water would be diverted from the Garrison Reservoir, on the Missouri River in North Dakota, to irrigate up to one million acres.[1] This investment is chosen not in order to evaluate it but to pose issues in a real context.

Most of the construction costs will be reflected in wage and salary payments, either directly to persons building the project or indirectly to those producing materials and equipment. A possible *without* situation for some of these persons is employment in other jobs. This would be particularly relevant for persons building the project. During construction their livelihood may depend completely on the project, so that without the project pressures to be in some alternative employment would be strong. An example is a skilled technician who will be in this part of the country only because of construction of the project. Without the project he would probably have found similar work somewhere else. Does this necessarily mean that, with the project, the work he would have been doing elsewhere will not be done? No, because the job vacancy elsewhere might well be filled by a technician not attracted to the project. This latter technician moreover could have been working in yet another job, and so on. A typical view is that ramifications continue until ultimately some output somewhere in the economy is precluded and that market forces might tend to make the salary of the project technician equal to the value of this precluded output. In the spirit of benefit-cost analysis, then, his salary estimates value of alternatives foregone because of his employment on the project.

The foregoing view of effects of hiring the technician fails to give attention to threshold perception levels and to effects on organizational efficiency, leisure, and unemployment. The company with the initial vacancy may hire no replacement technician. Among several adjustments made by the company may be slight reductions in quality of its services. That is, there may be a tendency to try to satisfy the same number of customers even though staff is reduced. And the customers may not notice. This is because the minor cutting of corners is not great enough to reach their threshold perception levels. The attempt to satisfy the same number of customers may lead to changes that increase organizational efficiency. For instance, there may be general reassignment of responsibilities affecting productivity, or stricter measures may be taken to reduce idleness in offices. As another type of adjustment, salaried men may work longer and overtime opportunities may be offered to hourly workers. In this manner, people may be induced to make labor for leisure substitutions that would not otherwise have taken place. If the firm decides to replace the technician, the most likely effect may be to decrease frictional unemployment instead of leading to the decline in technician services elsewhere that was envisaged in the preceding paragraph.

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[1] The 86th Cong., 2nd Sess., *Garrison Diversion Unit,* House Doc. No. 325 (Government Printing Office, 1960).

Similar considerations apply to construction laborers, persons producing materials for the project and to farmers who will be on the irrigated land.

Estimated cost of construction for the Garrison Unit is 529 million dollars.[3] We guess that the reduction in value of products elsewhere if this project were constructed might be between 25 million and 250 million dollars. To more seriously estimate this reduction would require new surveys and analyses that might be neither too complicated nor too expensive.

The bigger the investment, the greater the likelihood of exceeding the possibilities suggested above for production from slack. There may therefore be a difference between contemplating an entire program and an individual project. For instance, the entire reclamation program of several projects being constructed simultaneously may require foregoing more alternative production than the sum attributed to the individual projects when analyzed along the lines above. This suggests that as one considers making large changes in investment expenditures in any one year, the addition of projects finally exhausting slack would have much larger effects than suggested above. This merely means that the evaluation of a major policy change is different from the evaluation of an individual project. Even when contemplating a major policy change, involving expenditures as great as the entire reclamation effort, the market cost of resources probably overstates the effect on value of product foregone.

Consider next value of project outputs. The irrigated land will be used primarily to grow feed crops which will increase livestock production in the area. It would appear that the value of livestock production in the area would be increased by the project from about 10 million to about 45 million dollars a year.[3] The larger number of livestock going into regional markets would affect prices only slightly if at all. Suppose that livestock prices received by farmers were reduced 1½ per cent in North Dakota and ½ per cent in the rest of the country. This corresponds to a $75 yearly reduction in estimated income per farm on the project, which might or might not induce a small downward supply response. No effect would be expected on retail meat prices or consumption. Rather, a result of the net increase in livestock production might be meat quality improvements which consumers for the most part would not perceive.

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[3] *Ibid.*, p. xxi.

Secondary benefits include values added locally by processing project outputs and increases in retail sales due to increased population and income. It is often argued that these benefits are likely to be matched by offsetting changes in the rest of the economy. However, pointedness of the locational effects of a project is relevant in estimating the degree to which the secondary benefits and costs offset each other. In the hypothetical case of a reclamation project drawing its farmers all from one other similar location, the decreases in processing and retail sales in that location would roughly equal the increases for the project area. In reality the locational effects are widely diffused and hence small enough in some areas to be likely to come out of slack.

To turn to fiscal effects, an individual project probably does little else than to increase the national debt by the amount of federal expenditure on it. Often taxpayer subsidy is mentioned, as if the project were being paid for by current taxes. It is conjectural whether Congress would alter taxes even in response to much larger changes in expenditures. Effects on taxpayers, which may well be nil, are likely to be limited to those caused by future higher interest payments. All this may be contrasted to a more standard theoretical view. For example, the borrowing for the project might unrealistically be assumed to increase interest rates and so help equilibrate by reducing aggregate demand elsewhere to offset the increased investment demand associated with the project.

This completes the re-examination of output effects of projects. Yet to be discussed is the different question of what effects are on people's satisfactions. A few of the output increases noted above are obtained at the expense of desired leisure. Discontinuities in the terms on which people can change their hours of work make for difficulties in valuing the leisure. Even if the individual's valuation of leisure were established, ambiguities regarding its social valuation might remain. For instance, economic growth needs for defense may mean that the social value of extra leisure hours is nonpositive. Threshold perception barriers are also relevant to project effects on people's satisfactions. Some of the output effects that have been discussed are not perceptible and so could not affect satisfaction.

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[3] *Ibid.*, pp. 56-57.

The discussion emphasizes that at best a benefit-cost analysis can establish tenuous presumptions about project effects. A conclusion might still be that benefit-cost comparisons of the usual type estimate what will happen on the average. To adequately judge the validity of this conclusion would require more exploration of the relation of frictions to equilibrium than is possible in this paper. Hypotheses about how the explorations would turn out are as follows. Small shocks, such as represented by natural resource projects, can be expected seldom to overcome frictions. If these were the only shocks occurring in the economy, project cost and output effects would almost always fritter away in slack. But big shocks (wars, major fiscal decisions, general business fluctuations) do overcome frictions and lead to a general reconsideration of decisions. Then equilibration familiar in economic analysis tends more forcefully to relate market values to marginal contributions to output. A crucial question for benefit-cost analysis is: After such big shocks occur, how different is the economy because of prior occurrence of a given small shock such as a natural resource project? A hunch is that some but not all of the initial slack effects of small shocks are eliminated by subsequent big shocks. This line of reasoning suggests the conclusion that market valuations overestimate project effects even in the long run, but that the overestimation is greater in the short run than in the long run. Among the implications, immediate construction expenditures may exaggerate the real costs of a project more than market valuations of outputs exaggerate the continuing project benefits.

In spite of shortcomings of estimates the recommendation here is not that benefit-cost analysis be discarded. Benefit-cost analysis appears desirable as a brake on complete disregard of national output considerations. But the recommendation is made to supplement usual estimates of direct costs and benefits with as accurate tracing as possible of chains of specific project effects. This should help improve estimates of direct benefits and costs, throw light on net secondary benefits, and bring out project effects on goals other than national output. A counterargument against the extension recommended here might be that, particularly because these effects are so difficult to estimate accurately, to admit them at all into the analysis opens the door to abuse. The answer would seem to be that the effects will be estimated one way or other by interested parties anyway. The evaluation of the Garrison Unit included the following apparently arbitrary additions to secondary benefits: $1,000 for each new family farm; 1.5 per cent of the increased farm investment "due to increased investment opportunity"; and 10 per cent of the direct farm benefits "as the public benefit to stabilization of local and regional economy."[4] In the 229-page report, 112 pages are devoted to an analysis by the Fish and Wildlife Service of project effects on undomesticated animals. For serious analysis to systematize appears better than to ignore project effects neglected in market-type evaluations of benefits and costs.

III. *Irreplaceable Assets*

Agricultural production from a reclamation project has close substitutes because it is largely indistinguishable from other agricultural production, but less perfect substitutes are available for the recreational enjoyment of, say, Yellowstone National Park. The poor-substitute case though perhaps more rare is the very one where the question of public intervention may be most important.

What is a park worth? Assume that the value of something to a consumer is the area under his demand curve for it. This assumption seems consistent with the usual valuation approach in benefit-cost analysis. For outputs whose total production is not much affected by a project or whose alternative supply is highly elastic, demand can be approximated as perfectly elastic at the market price over the whole range of project output. Thus price times quantity, i.e., market value of output, is the area under the demand curve for project output. For some specialized outputs, such as municipal water, the recommendation is often made to value at alternative cost of production. This may be viewed as an attempt to take account of the fact that the demand schedule for something can be a total demand schedule cut off at the top by alternative costs of securing it.

Suppose one first contemplates reproducing the park exactly. Then the alternative cost for a park with unique natural advantages may be indefinitely great. At no amount of park services that might be purchased would revenues be great enough to cover alternative cost. That is, the demand schedule for park services is not affected by the cost of the potential alternative.

Marion Clawson has suggested a way of approximating the demand curve for a park.[5] It is based on observing the proportion of the population that bears travel costs at various distances to visit the park. The method of estimation appears valid if the strong *ceteris paribus* assumption is fulfilled that the demand schedule of people for visiting the park has the same shape no matter what their distance from the

[4] *Ibid.*, p. 59.

[5] Marion Clawson, *Methods of Measuring the Demand for and Value of Outdoor Recreation* (Washington: Resources for the Future, Inc., 1959).

park. For use in benefit-cost analysis, the method has the advantages of being operational and objective. If the demand schedule does not need to be modified in view of costs of potential alternatives, the area under a Clawson-type schedule might be used to estimate park benefits.[6]

It may be desirable to consider alternatives other than reproducing the park exactly. If the demand schedule is viewed as the maximum amount per unit that would be paid for different levels of output, recreational alternatives that are good but not exact substitutes may influence the schedule. The demand schedule could tend to be flattened at the top by these potential imperfect alternatives. A general rule for estimating benefits would appear to be: Sum the maximum increases in revenue that could be obtained by increasing output from zero up to actual output, always allowing consumers the option of paying instead for potential alternative projects. Empirical studies with this aim appear feasible. For a park, the modification to allow for potential alternative projects is likely to be more important the less unique the natural advantages being considered.

The discussion so far has not questioned consumer sovereignty in placing values on benefits. The questioning may be desirable because projects involving irreplaceable assets lead to direct effects on the mix of products in the economy. It may be permissible in the close-substitute case of corn grown on a reclamation project to regard the additional corn as a generalized increase in income leading principally to reduction of corn grown elsewhere and increases in other commodities as released resources are transferred to alternative employments. However, the establishment of a park which preserves sites of unique scenic, recreational, or historic interest may reduce attendance at movies or at spectator sports events. Considerations in evaluating this change in product mix are providing desirable recreational opportunities for children and for future generations and encouraging desirable attitudes towards outdoor recreation. These suggest that market valuations understate the recreational value of parks.

Decisions on projects involving irreplaceable assets might be improved if a national resources policy were adopted. This policy would state in general terms the desirability of special consideration for projects which affect irreplaceable assets. The enunciation of a national resources policy should be the task of a commission reporting to the President and to Congress.[7]

A scoring system might be devised for rating projects according to their consistency with the policy. Points could be awarded for man-days of outdoor recreation, preservation of scenic beauty, preservation of sites having archeological or historical interest, and protection of wild lands against encroachments, with negative points for destruction of these values. On the basis of points awarded, each project could be placed in one of five groups designated 2, 1, 0, −1, −2. Those projects which neither contribute to nor detract from the goals of the national resources policy could be placed in the zero group; those that contribute moderately would fall in group one; and those making major contributions would be in group two. Similarly projects moderately or severely detracting would fall in groups minus-one or minus-two.

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[6] Clawson questioned the usefulness of this type of consumer-surplus approach.

[7] The proposed commission would have a task similar to but broader than that of the Outdoor Recreation Resources Review Commission established by Congress in 1958. See Outdoor Recreation Resources Review Commission, *Progress Report* (Jan., 1961).

A permanent committee independent of any agency involved in formulating projects should make these evaluations. The committee would include naturalists, historians, physical educators, engineers, and archeologists who would evaluate projects from the point of view of national resources policy. These evaluations, using uniform procedures, would provide greater comparability among projects in assessing effects on national resources goals. They would serve as indicators for these goals much as do benefit-cost ratios for national income goals. Greater consistency in substituting between goals might be achieved.

IV. *Time: Interest Rates, Horizons, and Interdependence*

Any positive interest rate favors a set of investments that sacrifices total product from the investments over the entire horizon, in order to secure near-term gain. This sacrifice can be rationalized by noting that projects with large near-term returns, combined with reinvestment of the returns, may lead to the possibility of more total product over the entire horizon being considered than is possible with projects having larger far-term returns. The latter offer only delayed opportunity for reinvestment. Hence many discussions imply that the appropriate discount rate is that at which returns could be reinvested; i.e., the opportunity rate of substituting between time periods.

Two main kinds of rates that have been recommended are private sector rates of return on real investments and time preference rates of households. These formulations seem to imply that the primary objective of government investments is to maximize private satisfactions in a current year. Yet other objectives are important if not paramount in many government actions related to the time course of income, such as fiscal decisions governing aggregate savings and tax and related policies affecting the private investment mix. One important objective is economic growth to secure future tax potential for defense and for government services such as education. Talk of how to speed up U. S. growth implies a questioning of individual valuations between present and future income.

A reasonable objective may be to choose the set of projects for a given government budget that will maximize growth of real national income. If all net income resulting from the projects were to be reinvested, the rate of return realized on the reinvestment would be used for discounting, for in line with the reasoning above, this rate would measure the opportunity cost of future returns. On the other hand, suppose that none of the returns from the projects were to be reinvested. Then there would be zero gain in growth from sacrificing far-term returns for near-term returns. That is, the rate of discount should be zero.

The real situation appears closer to the no-reinvestment case than to the full-reinvestment case. Suppose one is comparing a near-term benefit N and a far-term benefit F. If d is the number of years between the two benefits, then the near-term benefit will lead to an increase in income of $N\ (1 + kr)^d$ by the time F is realized, where k is proportion of returns reinvested and r is rate of return on the reinvestment. That is, kr is the rate at which benefits will add to subsequent income and is what must be foregone if subsequent benefits are chosen. Because it is the true reinvestment return, it indicates the amount which a benefit in a given year contributes to growth.

As a realistic illustration, suppose for each dollar of increase in net income, seventy-five cents will be spent for current private sector goods and services with ten cents going into private savings and fifteen cents going to government as taxes. Suppose the rate of return on the increase in real investment made possible by the private savings is 10 per cent. Suppose further that one-third of the increased taxes, or five cents of the original dollar, is used to increase real government investments whose rate of return is 10 per cent. The result is that fifteen cents of the original dollar of increased income is reinvested at a rate of return of 10 per cent ($k = .15$ and $r = .10$), so that the actual reinvestment return on the original dollar is 1.5 per cent.

The rate of discount just discussed does not take account of risk or uncertainty. A procedure that in practice might turn out to be more accurate than upping interest rates to allow for risk and uncertainty may be to consider returns as essentially certain up to a reasonable time horizon and zero thereafter. For instance, a relatively short horizon may be needed for investments whose benefits depend on location of future population and which are prone to obsolescence. This is particularly true if the more distant benefits could be obtained by investment at a later date. Generally, if horizons were oriented more closely to economic life and viewed more definitely as an uncertainty hedge, they would be shorter than those now used. If the suggestions in this paper related to time were followed, the number of projects appearing warranted might not be much affected, but there would be substitution in favor of projects paying off at low interest rates within short horizons.

Time is one of several considerations suggesting need for more attention to interrelations among river basin projects. A sequential procedure along the following lines can be recommended for scheduling projects. Consider first the independent projects, by which is meant those whose benefits and costs are neither affected by nor affect any other projects. If no limitation is likely on funds available for construction, schedule independent projects at the time which maximizes their value viewed from the present. The value of some projects viewed from date of initiation may be greater if they are delayed, as when a dam will produce hydroelectric power for which the demand will not materialize for several years. Yet one should delay the dam only if the value at date of initiation in any future year, when discounted back to the present, is greater than present value if constructed now. With limitation on funds, each year's funds would be a restraint and would lead to possibly more complex comparisons between projects.

For projects which may be affected by or may affect other projects, form groups whose benefits and costs are independent of all other groups. It may be necessary to reanalyze projects within each group to ensure that estimates are mutually consistent. Within each group, schedule the projects with a view to reducing the adverse effects if unforeseen events occur after construction has begun. Then, consider each group to be an independent project and follow the procedures indicated for independent projects.

V. *Conclusion*

Often the issues discussed above have been adjudged quantitatively unimportant, or analyses have stopped with assertions that they are untractable. This paper suggests revisions and expansions aimed at making documents like the Green Book better guides for benefit-cost analysis.[8] The interest rate and horizon recommendations of the paper are different from usual recommendations and imply changing some passages of the Green Book. The suggestion for using consumer surplus to estimate part of the benefits from irreplaceable assets implies adding a few paragraphs that would elaborate on existing approaches to benefit estimation. New major chapters would be needed in the Green Book to explain each of the following: (1) how to trace causal chains from a project particularly as related to frictions, (2) how to score projects for consistency with national resources policy, and (3) how to take account of project interrelations.

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[8] Subcommittee on Benefits and Costs, *Proposed Practices for Economic Analysis of River Basin Projects* (Inter-Agency River Basin Committee, 1958).

DISCUSSION

STEPHEN A. MARGLIN: Ostrom and Tolley and Harrell deal in part with a common issue: the planning of river development to reflect the multiple objectives of public policy. Economists are all too prone to think of economic efficiency (maximization of national income gains) as the only objective worthy of consideration, and I for one welcome the recognition that other objectives—my own favorite example is redistribution of income in favor of disadvantaged groups—have a role to play in planning. However, I am much less enthusiastic about their prescriptions for reflecting objectives other than national income gains in formulation of river development plans.

Take the Tolley-Harrell paper. It begins with a clarion call for recognition that national income gains are not the be-all and end-all of water resources development. Their conclusion, alas, does not reflect the promise of the opening paragraph. To be sure, their specific recommendations for investment standards admit objectives other than national income gains ("location of activity" and "distribution of income," to name but two), but these objectives seem to this reader at least to receive distinctly second-class treatment, separate and unequal.

More important, Tolley and Harrell concern themselves with standards for project review: they say simply that the summary report for each project proposal is to include a description of project effects in dimensions other than national income gains. They do not address themselves to the problem of resolving conflicts between the national income objective and other objectives in plan formulation.

They do, it is true, state that nonnational income objectives "should not interfere with the requirement that each project should have measurable net benefits" (that is, that each project should show a positive contribution to national income), but this is an insufficient guide for planning. Once this requirement is met, should project planners concentrate their attention on objectives other than national income gains, or should they trade national income for gains in other dimensions only if the "price" is right?

How, in other words, should objectives be balanced in project plan formulation? Who should make the value judgments required to establish a "price ratio" for trading gains in terms of one objective for gains in terms of another? Tolley and Harrell are silent on these points.

Ostrom, if I read him aright, would match the multiplicity of objectives with a multiplicity of competing planning agencies within the federal government, as well as a multiplicity of agencies at other levels of government and within the private sector. Each would formulate plans in accordance with its own understanding of the balance to be struck among conflicting objectives, each presumably emphasizing a different objective in accordance with its own understanding of its special mission. In this way plans reflecting varying balances among objectives would be brought forward, and no objective would be overlooked. Ostrom does not discuss the problem of choosing a single plan from the many that would emerge from the agencies, and this, it seems to me, is the rub in the "agency-competition" approach to the problem of implementing multiple objectives. Two possible solutions, at least for resolving the differences among the plans proposed by federal agencies, are (1) to oblige the agencies to work out a mutually satisfactory compromise plan for presentation by the Administration to Congress and (2) to allow each agency to submit its own plan to Congress and to assign the function of choice to that body.

The first solution ensures only that the balance of objectives which emerges in the compromise will reflect the balance of power of the agencies. The Pick-Sloan plan is an all too obvious example.

The second solution means in effect that Congressional committees rather than Congress will make the choices among various plans, and this in turn has all too often meant that the choice is made by the Representative or Senator from the state of X, Y, or Z. It is too much to expect that a national policy will be reflected in balancing national income gains against regional income gains (for example) when the balancing act is performed by individuals far more dependent for their tenure in office on incomes within the region than on incomes within the nation at large.

The limitations inherent in discussion papers prevent me from developing alternative ideas on implementation of multiple objectives here. Alternative views can be found in the Report of the Panel of Consultants to the Bureau of the Budget (M. Hufschmidt, Chairman), "Standards and Criteria for Formulating and Evaluating Federal Water Resources Development" (Bureau of the Budget, Washington, 1961, mimeo.) and in A. Maass *et al., Design of Water-Resource Systems* (Harvard University Press, Cambridge, 1962).

JEROME W. MILLIMAN: Ostrom's paper is directed toward an examination of institutional arrangements for the allocation of water among competing uses. He views economists as being primarily concerned with the appropriateness of the market mechanism. In contrast, political scientists are said to consider comprehensive, multipurpose planning through public institutions. Ostrom suggests that the market approach is most applicable to consumptive uses of water; nonconsumptive (or "in-the-channel") uses are best handled by government action. However, neither the prescriptions of economists nor political scientists seem to be followed. Instead, according to Ostrom, a host of institutional arrangements have arisen which follow neither market principles nor those of comprehensive planning—yet these arrangements seem to have viability and usefulness. Ostrom ends with a plea for increased attention to the "public interest" aspects inherent in nonconsumptive uses of water along with the perfection of market arrangements for developing consumptive uses.

Most of the advice is quite sensible. It would be difficult to quarrel with Ostrom's general conclusions. Within the well-established tradition of a discussant, however, I wish to suggest some clarification and modification of Ostrom's analysis.

In my opinion, Ostrom shows some confusion in his use of the terms "consumptive" and "nonconsumptive." Consumptive use of water should be considered as a matter of degree. The measure of consumption (in an economic sense) is not whether the exclusion principle can be applied. Rather, it is whether a particular use causes some other desirable use to be foregone. Any use of water is necessarily consumptive with regard to uses that are competitive with it. A use is nonconsumptive only to the extent that other uses are noncompetitive.

So-called "nonconsumptive" uses are difficult to find because, in most cases, use of water involves some impairment of the qualities which give it economic value. Navigation is cited by Ostrom as being a nonconsumptive use of water. Perhaps it is in a narrow context, but provision of water for navigation may preclude the diversion of water for other uses and thus be an extremely consumptive use of water. Allied uses along a stream (e.g., recreation, flood control, dissipation of wastes) are likely to be only partially noncompetitive. Furthermore, upstream uses are often consumptive (competitive) with reference to downstream uses.

Optimal allocation from the standpoint of efficiency may be achieved in the case of partially competitive uses by equating marginal products per unit of consumptive use. The joint marginal product of a group of noncompetitive uses may be found by adding the separate marginal products of each member of the group. Allocation among groups of uses (in contrast to allocation within groups) is optimal when joint marginal products are equated.

These principles of efficient allocation are independent of the particular institutional arrangements employed for their implementation. The dichotomy that Ostrom draws between the tasks of the economist and the political scientist is incorrect—not just in the handling of consumptive versus nonconsumptive use, but also in the relative roles assigned to each social science. Surely economists have not limited themselves to the appropriateness of the market mechanism. Inability to apply the exclusion principle is just one factor along with many other factors that make it desirable to modify or abandon the ordinary market mechanism in order to achieve an efficient allocation of resources.

River basins should not be operated in piecemeal fashion. Centralized or co-ordinated decision making is mandatory. For example, governmental action to make or to co-ordinate decisions may be required to maximize economic returns where incomplete property rights limit the use of the price system. But economic analysis and efficiency calculations—the whole problem of rational choice—are not tied to the use of market mechanism.

Many social scientists act as if economic principles cannot, and perhaps should not, be applied to public investment decisions. This is a bit ironic when one of the major reasons for public development, in the first place, is the inefficiency which results from fragmented decision making by private firms in the river basin context. Furthermore, as Ostrom suggests, governmental decision making itself is often fragmented and less than comprehensive.

Admittedly, the measurement of returns and costs may not be easy. Costs must always reflect alternatives sacrificed. But there is no way out of the necessity for maximizing net returns (somehow measured); difficulty of finding answers to the correct questions does not excuse the use of easy answers to the wrong questions. Moreover, the measurements of the magnitude of returns and costs requires some estimation of their incidence so that questions of the proper distribution of income and wealth can be viewed more rationally.

Just what may or may not be "in the public interest" is not always clear. The term itself may be used to refer to a whole range of wise intentions and platitudes. If the term is to have some operational meaning, however, both political scientists and economists need to sharpen their tools of analysis and to venture forth, as Ostrom has done, into the realms of political economy and public administration. New institutional arrangements must be devised to meet theoretical and operational inadequacies that characterize both the market and the political allocation processes. This is the area of the greatest challenge for achieving efficiency in the development and use of water resources.

The paper by Tolley and Harrell attempts to broaden the technique of benefit-cost analysis to include additional variables affecting the evaluation of water projects. Some of these variables are social goals, uncertainty, unemployment, and organizational efficiency. All of this is to be done without either sacrificing rigor of analysis or operational usefulness.

In my opinion, however, the paper constitutes a quick tour through the field of benefit-cost analysis. Part of the discussion is too generalized to be operational; many plausible conclusions are reached but they are neither new nor exciting. At times the paper seems to mirror the language and viewpoints contained in the Green Book. In fact, the last of the paper is largely a summary of criteria recommended by a U.S. Study Commission. On a few points I am not content to just ride along on the tour; rather it seems to me that some of the routes taken by Tolley and Harrell may be dead ends.

The discussion of the selection of the discount rate to use in project evaluation is perhaps the most unsatisfactory part of the paper. On the one hand, we are cautioned that the discount rate on federal projects should not be less than the rate upon long-term government bonds. This seems to contradict earlier reasoning in the paper that zero discount rates might be suitable for long-lived projects yielding services which have no close substitutes. I fail to understand why lack of substitutibility, in itself, is an argument for zero discount rates. Furthermore, there is no necessary reason why benefits just because they are social should also be discounted at low rates of interest. Yet, at still another spot, the authors advise us that there should be a "numerical calculation of the interest rate to be used in discounting benefits and costs." Strangely enough, the type of numerical calculation and the considerations involved are left unspecified. I submit that these statements neither broaden the scope of benefit-cost analysis nor add to its analytical rigor.

The same lack of precision is found in the "with and without" discussion of measuring net benefits. Never are the alternative projects which might be sacrificed by the project in question explicitly taken into account. The fact that the discount rate must reflect the marginal productivity of capital is neglected. Nowhere is it mentioned that the risk function may or may not be dependent upon the time stream. Therefore, it would be incorrect in many cases to change the discount rate to reflect riskiness. Why do Tolley and Harrell advocate the use of benefit-cost ratios at many spots yet base their reasoning upon the establishment of net measurable benefits which must imply the use of $B - C$ as a criterion?

Vagueness and lack of analytical rigor are again exhibited toward the end of the paper when in the context of limited funds (when are they not limited?) there is a discussion of how to select or rank projects with varying kinds and amounts of net benefits, time streams, and uncertainty. Here Tolley and Harrell tell us: "Since not all desirable projects can be scheduled in any one year, exchange will be necessary between measurable net benefits, shortest feasible time horizon and other project consequences. These changes should show a pattern of consistent choice." At this point I began to wonder whether Tolley and Harrell were really at a "dead end." Instead, it appeared probable that the discussant had simply taken the wrong tour or perhaps caught the wrong bus.

THE TEACHING OF ECONOMICS

THE CONTENT OF THE INTRODUCTORY COURSE

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It would seem rather unlikely that there could be anything new to be said about the content of the introductory course. The subject has been rather thoroughly worked over in recent years in a highly competent way in several places [10] [2] [6]. The fact that those responsible for the program of these meetings nevertheless found it desirable to provide a place for this subject suggests, not that they were unaware of the recent attempts to settle the matter, but rather that, in spite of past efforts, the matter is by no means settled.

For one thing, there really is no single "best" content. The appropriate subject matter surely will depend in some degree upon the particular situation, the objectives, and the kind of students of the particular institution. But these differences are not so great that something of general applicability cannot be said about the desirable content of the course.

It also needs to be recognized that the desirable content of the course may be expected to change as the subject of economics itself progresses. But if the appropriate content of the course is still a matter that appears to need further discussion, it surely is not because existing courses have failed to keep up with the progress of economics or with changing emphasis on new problem areas. Although it took twelve years for the general theory of employment to find its way into an elementary text and nearly as many for that questionable implement, the kinked demand curve, to be utilized and for full-cost pricing to be given a place beside marginalism, textbook writers have usually been more prompt. An examination of seventeen contemporary elementary textbooks shows that their authors have been quick to absorb into their offerings the most recent developments in economic theory and analysis —even to the extent of including references to input-output analysis [7, pages 833-35], linear programming techniques [1, page 749], and econometrics [1, pages 754-56]. They have in recent years added chapters on economic development and appropriately devoted more attention to Soviet-type planned economies. The intense monopolistic competition of textbook writers, always hopeful of hitting the jackpot in what can be a highly lucrative market, is very effective indeed in giving us a generous supply of up-to-the-minute texts.

The essential reason that the appropriate content of the introductory course is still a subject of discussion is that few instructors in the subject are happy with the course as it now is. Although the principal complaint has been emphasized repeatedly in discussions of the course, not very much has been done about it. There is a pronounced cultural lag between diagnosis of the trouble and application of the remedy. I can do no more than restate the problem once more and indicate how I think the content of the course should be changed in order to meet it.

The fudamental difficulty is that the course tries to cover too much territory. As a survey course, when this is the form it takes, it tries to include in its purview the whole of economics. As a course in problems, it tries to leave no contemporary economic issue of policy unresolved —or at least undiscussed. This was a major complaint of the Hewett subcommittee of the Taylor committee which reviewed the state of the elementary course in 1950 [10, pages 56-58]. The same complaint has been registered frequently since then, and with good reason.

Some evidence of the diversity of subject matter included in the typical elementary course is provided by the answers to a questionnaire distributed to economics departments in 300 four-year colleges and universities in the summer of 1957 in connection with the survey made by the economics department at Grinnell College [6, pages 261-64]. Respondents were asked to check (in a list of 21 topics) the subjects to which the equivalent of two or more class meetings were devoted. One-fifth of those replying found it necessary to add topics to the list; and these were mainly respondents who actually checked 17 to 20 of the listed topics. In the case of 133 two-semester and two- or three-quarter courses, over half of the respondents reported that their courses covered 14 or more of the topics. The Grinnell survey described the typical elementary course taught in 1956-57 as follows [6, pages 264-65]:

> . . . a two-semester course open to sophomores and above, with credit given for taking one semester. The first semester consists, roughly, of macro-economics and the second of micro-economics. There are no course prerequisites. One textbook is supplemented by readings from one readings book. The topics in the course are agriculture, business organization, business cycles, comparative economic systems, economic growth and development, income distribution, income-employment theory, international economics, labor economics or problems, money and banking, market structure, national income accounting, price theory (marginal analysis), and public finance.

Respondents to the earlier Hewett subcommittee questionnaire overwhelmingly reported that their respective elementary courses were typically general survey courses ("covering, say, all or nearly [all] of the topics included in such textbooks as that of Fairchild, Furness, and Buck") [10, page 64]. As the authors of the Grinnell survey said [6, page 264]:

Considering the complexity of the topics and the large body of institutional material associated with most, the generally expressed dissatisfaction with the course is not surprising.

The same diversity of subject matter is to be found in the elementary texts currently in use. I have examined 17 texts either published or revised between 1957 and 1961, including those that are known to be most popular. The median-length text is 692 pages, but 6 of the 17 are over 800 pages and only one is under 400 pages. Taking the Grinnell College survey's list of topics, and adding to it as necessary, I found that the average number of topics covered was 15, close to the median number of topics (14) which the survey found included in the 133 two-semester and two- and three-quarter courses. Not surprisingly, the 15 most commonly occurring topics in the 17 textbooks included the 14 most commonly occurring topics in the 133 courses. Although in general the longest textbooks covered the most topics (the two most popular texts—both in the over-800-pages category—treated 21 and 17 topics respectively), there was one textbook of 435 pages which also treated 21 topics. (Of course, what is a "topic" in this context is a matter of judgment; I simply tried to follow the pattern provided by the Grinnell College survey.)

Textbook writers, like television broadcasting companies, would probably claim that they are simply giving the market what it wants: consumer sovereignty prevails. In fact, one author in his preface explains that, whereas he originally succeeded in writing a reasonably brief text, he has had to expand the book (by about 140 pages) and its topical coverage in the subsequent edition because of the suggestions coming from users of the text [4, page ix].

The expansion of topical coverage and the increase in size of the textbook are also, in part, to be explained by the understandable desire of the publisher (and the author too) to meet the widely diverse requirements of different teachers. The ideal textbook from the publisher's point of view is one adaptable for use in every conceivable type of elementary course. Hence textbook writers promptly adopt one another's innovations, and the result on the one hand is an extraordinary degree of uniformity of coverage and treatment—with differentiation of product limited to unimportant features. (One author proudly reported that in his third edition: "The most striking innovation is the addition of color. This increase in aesthetic appeal of the format will in itself enhance the book's usefulness as an aid in learning" [5, page ix].)

On the other hand, the lack of available texts of high quality for courses that depart very far from the norm has surely had a stultifying effect upon innovation in the content of the introductory course; monopolistic competition between textbook authors and publishers has strengthened the tendency, already strong, to make the course a survey, necessarily superficial, of the whole subject matter of economics.

The broad coverage characteristic of the elementary course in most institutions also results from the attempt to kill two birds with one stone. The course has typically been designed to serve simultaneously the objectives of preparing prospective economics majors for advanced work and of providing other students (who often do not take further courses in the subject) with that understanding of economics that all students should have ". . . as an essential part of a liberal education and a preparation for responsible citizenship" [8, page v].

Now the purpose of preparing prospective major students is best served, it has been thought, by providing a basic foundation in the principles of economics, with a heavy emphasis on "development of analytical thinking and methods of analysis" [9, page 66]; while the best course for nonmajors was one which introduced the student to contemporary economic problems in their historical and institutional setting, and showed how the principles of economics could be used to cut through the complexities of the problems and to arrive at sound solutions. Both objectives called for a heavy emphasis on principles. The idea is that you first give the students a thorough training in tools of analysis and then you show them how these tools can be used to analyze a wide variety of contemporary economic problems. The prospective major student gets the training in principles that he needs for subsequent more advanced courses; and the nonmajor student learns what he needs to know to be able, later in life, intelligently to appraise public policy proposals related to the economic problems of that time.

The difficulty with this kind of course is that it does not serve either group of students well. The training in the tools of analysis is not adequate for the needs of major students; and often they are accordingly required to cover the same ground again more thoroughly in subsequent courses. The larger proportion of the students in the elementary course, taking it as part of their general education program, retain little of what they learn of the principles of economics; and the necessarily superficial treatment of each of a considerable list of contemporary problems gives them little understanding of any one of the problems. A really good teacher, in spite of the content of the course, may succeed in giving the better students something worth while; but he is working under serious handicaps.

As a first step towards the improvement of the content of the course I urge that we abandon the idea of using it at all as a training ground for prospective major students. As long as the course is in any considerable degree designed to provide technical training for advanced work, it cannot be satisfactorily geared to meeting the needs of a liberal education for nonmajors. Prospective major students probably constitute no more than 10 or 15 per cent of the class [6, page 234]; they still will find the kind of course I am going to outline an appropriate introduction to the subject—but their technical training in economic theory will have to come later.

Once this decision is made, the problem of improving the content of the course becomes much simpler. It now becomes possible to abandon the emphasis upon tools of analysis as such. This does not mean that the course would not contain any theory; rather, the theoretical principles included would be selected and utilized solely with a view to giving the terminal student an understanding of how the economic system works, and not with a view to making him into a fledgling economist.

What kind of course, then, would best serve the objectives of a liberal arts education—for students most of whom will take no further courses in the subject? It is clear, I believe, that no lasting good is to be served by a course purely descriptive of contemporary economic institutions; nor by a survey course that attempts thinly to cover the whole subject-matter area of economics; nor by a course that seeks to provide answers to the whole range of contemporary economic problems. As Gambs and Wertimer have said, with pardonable exaggeration [3, pages viii-ix]:

> . . . many competent sophomores, after being dragged through 800 large pages, . . . come out at the other end in a fog instead of in the light, having derived few educational values of any kind from a year of bewildering study. We find that the muse who presides over the art of leaving things out is more difficult to serve than the one who governs the art of including everything but the kitchen stove.

The liberal educational values that should be provided by an introductory course in economics and which have some chance of being retained by the student in later life are the following: (1) He can be given a comprehension of what an economic system is, and how its interdependent elements operate to allocate resources to different uses, to maintain or not to maintain full employment of resources, and to promote or not to promote growth in income and welfare over time. (2) He can acquire a way of thinking about economic issues—the habit of looking at them analytically, of treating them objectively, and of separating out the value judgments involved from the analysis of how the system works.

A course with the first of these two objectives will clearly utilize both micro- and macroeconomic theory. But the theory will not be presented as such; and many of the technical refinements that have become a part of the treatment in elementary texts may be dispensed with. Thus, in showing how the allocating function of the economic system works, the conception of the price system must be developed.

The responsiveness of supply, in the production of individual commodities, to changes in relative demand; the responsiveness of demand to changes in wants and in income, to advertising, and to other social pressures; the notion of opportunity cost; the part played by varying degrees of monopoly and competition in different sectors; supply and demand in the labor market; the functional importance of the interest rate as the price of finance—these broad aspects of the functioning of the price system can be presented with a minimum of technical refinements and diagrammatics. The emphasis should consistently be upon allocation, efficiency, and welfare implications.

How would this treatment of the working of the price system differ from that usually found? First, the theory of the firm would play a minor role. The firm's responsiveness to signals from the price system could be adequately examined without having to employ the whole intricate structure of diagrammatics and numerical illustrations of marginal analysis. (At present, we may spend as much as a week or even two trying to penetrate the sophomore's tough protective armor with the distinctions between marginal and average variable cost, between average variable cost and average total cost, between average total cost in the long run and in the short run, and with the respective functional relations between these various kinds of cost and output. Then we further frustrate the student by modifying all of this with the full-cost principle.)

Second, the elaborate short-run model of the firm should be reduced to the dimensions of a passing reference to the time required for varying degrees of responsiveness of supply to a change in demand. Third, speculative markets can be passed over completely. Fourth, the treatment of such technical concepts as elasticity of demand should be played down; why fuss, for example, with point and arc elasticity when the concept can be developed simply in terms of the response of total outlay to change in price? Away with the degree of monopoly, the full-cost principle, break-even charts, linear programming, input-output, marginal productivity. Leave these technical tools to the subsequent course in price theory designed for major students.

The treatment of the system from the macroeconomic point of view would not differ so radically from that found in the typical course today: the national accounts, the aggregative model based on the consumption function and multiplier, the investment schedule, the monetary and banking system, and the governmental sector. But much technical detail could be spared: the recital of the various theories of the business cycle; the quantity theory of money; the organization of the Federal Reserve System; the minor instruments of monetary policy. The emphasis should be consistently upon the interrelationships of the economic system which are responsible for the level of employment and the rate of growth of aggregate production.

Throughout the whole first part of the course devoted to the examination of the way in which the economic system works, institutional aspects should be stressed, illustrations of important relationships should be drawn from the working of the U.S. and other economies, and appropriate comparisons with the working of a planned economy, such as the Soviet one, should be made. For example, U.S. agriculture under the support-price program could be used to advantage to illustrate supply and demand adjustments through the operation of the price system—but this would not require an extended treatment of the agricultural problem as such. The allocating mechanism of the predominantly free enterprise price system could be contrasted with that of the fully planned system, without digressing to give a full discussion of the Soviet system of production and distribution. The successive cycles of the United States since 1945 could be reviewed to illustrate the incidence of unemployment and of inflation in the working of our economy. And so on.

The second major objective of the course is to inculcate on the student the economist's way of looking at and analyzing economic issues and problems. Although this can best be done by examining contemporary problems, the purpose is not to teach answers to problems, for these can have no more than transitory usefulness. Instead, the purpose is to give the student practice in analysis, to show him by example and through the reading materials what thoroughgoing economic analysis is like, what is meant by an objective in contrast to a propagandist approach, how to distinguish between value judgments and analysis, and how to recognize partially hidden value judgments.

This can best be done by selecting a small number of currently important problems or issues and examining them intensively. Suppose, for example, we decide to concentrate on three: the problems of inflation, the lagging rate of economic growth, and the adverse balance of payments. Instead of devoting one week of a semester to each of these, we devote five. Instead of a chapter, or part of one, plus short extracts of a popular sort from a book of readings, we assign thoroughgoing treatments of the subjects drawn from the professional literature and governmental hearings and reports. To whatever extent necessary we supplement the earlier theoretical and institutional treatment of the working of the economic system with additional tools of analysis specifically appropriate to the examination of the selected problems.

The success of this part of the course depends upon the ability of the instructor to change the thought-patterns of his student. If the purpose of a liberal education is to free the mind, in some degree, from preconceptions, prejudices, and biases acquired from a narrowly circumscribed earlier environment, this course should attempt to do just that. It should, in some small degree at least, change the student's whole way of looking at the economic world around him, the attitude with which he confronts economic issues in later life, and the perceptiveness with which he will scrutinize the arguments of special pleaders and even of economists.

The principal difficulty with such a course, it must be admitted, is to find appropriate reading materials for assignment to the class, particularly with regard to the first part of the course—the economic system and how it works. The longer texts that stress theory all become involved heavily in marginalism and in technical refinements of the theory of the firm, demand, business cycles, etc. Two or three of the longer texts provide separate treatments of the allocative functions of the price system in simple terms of supply and demand, but these separate treatments are quite inadequate. The same can be said of the shorter texts that stress the institutional approach. About the best that the teacher can do, until textbook writers change their ways, is to select a relatively small number of chapters from almost any text (and this means that the student pays heavily for a small amount of reading material appropriate to the course) and to supplement it extensively in the classroom presentation.

With regard to the second part of the course—the intensive treatment of a few contemporary problems—the textbooks available provide brief treatments from which a beginning can be made; but they need to be supplemented with other nontextbook materials such as monographs, hearings and reports of governmental agencies, and even articles in the professional journals that are not too technical for the beginning student. (Some papers in *Proceedings* volumes of this Association can be very useful indeed.) The major problem here is not the lack of materials appropriate to the course but rather the economic problem of providing adequate supplies of the materials for the use of large classes, if reliance is mainly upon the library, or of the cost to the student if he is required to purchase several different books in addition to an expensive and only moderately useful textbook.

However, I believe that there are enough teachers of the introductory course who are dissatisfied with it, as it is usually given, so that one of these days a textbook writer will come along who has the ability and the courage to prepare reading materials appropriate not for a survey course covering the whole wide range that economics attempts to cover, but instead appropriate for a course with the limited objectives of showing in simple terms how the economic system works and of giving the student an opportunity to learn, through an intensive treatment of a small number of contemporary problems, how to approach economic issues analytically and with an open mind.

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RELATION OF THE UNDERGRADUATE MAJOR TO GRADUATE ECONOMICS

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My assignment here is to discuss the relation of the undergraduate major to graduate economics. In interpreting this assignment I have been puzzled as to whether this should be a report on what it is or what it should be. I was tempted to interpret it as the former, because then I could merely say "None" and sit down. But in all fairness, this subject does deserve serious consideration in planning both the undergraduate curriculum and the graduate program.

Pressures on the Undergraduate Program in Economics. In examining this question, I think that it would be wise to consider first the nature of the undergraduate economics curriculum as it is presently organized in many of our colleges and universities. It is, of course, very difficult to inventory or summarize what the typical undergraduate economics curriculum is like in all kinds of academic institutions, but it is fair to state that there are a number of pressures in common which influence the shape of the economics courses which are offered and of the major itself. By examining these pressures one can get a clearer picture of the undergraduate major.

The Teaching Body. One of the first and perhaps the most important set of pressure groups is the teaching body itself. In most departments of economics, it is to be hoped, those engaged in teaching are themselves professional economists, and they have a tendency to wish that their students were professional economists. In fact, the pride and joy of a teacher is a student who wants to be just like that teacher; and in a profession where theory, abstraction, and a high degree of specialization are status symbols, the results for the teaching curriculum are obvious. The problem is made even more difficult by the fact that the elementary course is often taught by students in the process of becoming professional economists or faculty members with brand new Ph.D.'s. The energy and enthusiasm of these teachers is very great, and they are anxious to impart to the students the full kit of abstract tools which they themselves have so recently mastered. Furthermore, this basic course tends, as indicated in Professor Haley's excellent paper, to try to include in its purview the whole of economics. As a result the student is expected to master not only the formal analytical framework but also contemporary economic policy issues and major economic institutions. The purpose of such an elementary course is twofold. It is to provide a survey of economics for the large body of undergraduates who want no more, and at the same time it is intended to equip the student who expects to major in the field of economics with the basic tools he will require for the more advanced courses. In most institutions the elementary course is a prerequisite for other courses in economics, and it is expected that higher level courses will build on the foundation of the elementary course.

The Students. A second set of pressures which shape the undergraduate curriculum in economics is provided by the students in economics courses. Although somewhere between 50 and 75 per cent of undergraduates usually take the basic elementary course in economics, it is rare that more than 10 or 15 per cent of those taking this course become economics majors. There is therefore considerable resistance on the part of the students to absorbing basic tools which are being developed for later use, and the elementary course is often considered to be difficult and uninspired. But due to its attempt at comprehensive coverage, it is also often considered both crammed and superficial. Because it caters to large numbers it is difficult to insure even standards of instruction, which are necessary if the course is to be used as a preparation for subsequent courses. Most teachers of upper class courses in economics feel that they must re-teach the fundamentals if they expect to utilize them. As a result both micro- and macrotheory tend to be taught again in many different courses. In some programs majors are required to take a special theory course, but since the upper class courses are not taken exclusively by economics majors one cannot expect in any given advanced course that all students will have had the necessary background. There is thus little of a cumulative nature in the undergraduate curriculum in economics.

The problem of designing the economics curriculum is further complicated by the fact that only a small fraction of economics majors are themselves interested in graduate training in economics. Not more than 3 or 4 per cent of economics majors can be expected to go on to graduate school in economics. Thus in terms of the original students in the elementary course the order of magnitude of those going on to graduate school in economics would be considerably less than one out of a hundred. Economics majors often go directly into business or, when they do go on to graduate school, go to law schools or business schools. From the students' point of view, therefore, since few of them are interested in becoming professional economists, they tend to shy away from courses that are primarily intended to prepare the students to be professional economists.

Other Requirements. Another source of pressure on the curriculum at the undergraduate level is the general university requirements which are placed upon all fields of major specialization. Most universities are increasingly cognizant of the importance of a general liberal arts education, the products of which are not expected to be specialists in any particular area. For this reason, there are distribution requirements, and in a great many instances there is a specific limitation on the number of courses a student is permitted to take within his major.

In addition to the pressure of the university in trying to prevent overspecialization or professionalization at the undergraduate level, the interests of other fields of specialization tend to bring some pressure for economics courses interrelated to other disciplines. Thus departments of history, political science, engineering, etc., look for either interdisciplinary courses or at least courses which majors in their particular fields of specialization would be interested in taking as part of their distribution requirements. Such pressures as these tend to dull the edge of professionalism and create a whole range of courses which are not strictly economics and yet can count as a part of a major in economics.

Given the relatively small number of majors who will wish to go on to graduate school and the relatively large number of both economics and other majors pressing for more generalized courses it becomes difficult for a department of economics to maintain advanced courses which actually contribute to preparation for graduate work in economics. Thus, for example, an undergraduate course on mathematical economics may well end up with enrollment of only two or three students, and this small enrollment combined with the pressures for staffing other courses may well result in the mathematical economics course being considered too costly an enterprise for the number of students involved.

Effects of Pressures on the Undergraduate Economics Major. In summary, given these pressures, what emerges as the preparation of the undergraduate major in economics? In the first place, when the potential graduate student in economics is a freshman or sophomore in college he enrolls in a large introductory course which most of his classmates will take as their only course in economics but which the instructor teaches as if all his students were going to take more advanced courses in economics, become economics majors, and potentially be Ph.D. candidates in economics. This beginning is not too auspicious even for the one student out of a hundred whose needs the course meets, since there is so much divergence between the intent of most of the students and the objectives of the teacher. The pace of the course becomes extremely uneven, obvious abstractions are pounded into the students, and too much ground is covered. The next experience of the potential Ph.D. candidate may be a required course in economic theory and/or economic statistics and accounting. The theory course may be restricted to students majoring in economics, but unless a differentialization is made between honors students and non-honors students it will include many students whose fathers insisted they take economics because they were going into business (if a separate business program is not available). These students often dislike the course, do not see the need for it, and do poorly in it. The separation of honors students from non-honors students at this juncture is very useful for the potential economics graduate student since it permits the honors course to be taught at an entirely different level. Experience at Yale was that when this separation was successfully made there was a sharp increase in the percentage of undergraduate majors who chose the honors program, and an additional increase in the percentage of those in the honors program going on for a Ph.D. in economics. Of course, separation of honors and non-honors students does leave the teacher of the non-honors theory course in an unenviable position, and there is a temptation to abandon the attempt.

The other upper-class courses for the economics major are generally open to anyone who has had the elementary course. Given the nature of the elementary course, it is generally necessary that these courses start over from scratch especially since the majority of students in each course will be of non-honors caliber. Consequently, there is a tendency for all courses to be survey courses, and for none of them ever to reach the frontiers of the subject—a situation which is not likely to hold the interest of either the future businessman or the future professional economist.

At Yale we have tried to meet this problem by setting up specialized seminars in the senior year for students majoring in economics. In order to gain entrance to these seminars students are required not only to be economics majors but also to have previously taken the principal course within the specialized area. Thus a seminar in the field of international trade will be taken only by majors who have had the basic international trade course. Every major is required to take one of these seminars in his senior year. The success of this gambit is somewhat open to question. In contrast with the enthusiasm shown for the honors theory seminar in the junior year the reaction to the senior specialized seminar has been very uneven. Some are highly successful, but others are a chore for all concerned. It still remains true that most of the economics majors are not interested in becoming professional economists and do not expect to go on to graduate school in economics. Furthermore, since the seminars cover both honors and non-honors students the course must be adapted to quite different levels of accomplishment and ranges of interest on the part of the students. Although we are not discouraged about this arrangement to the point of discontinuing it, we feel that it leaves much to be desired and we are actively seeking some better arrangement.

In effect, then, the only major element in the undergraduate program which ties in with graduate training is the junior seminar in economic theory for honors students majoring in economics. This course, which is taught at a high professional level, does manage to catch the enthusiasm of the students and persuade some of them to go on into graduate work in economics.

The Graduate Program and the Entering Student. Looking at the problem from the point of view of the graduate school, the present situation is one in which students arrive with a wide variety of backgrounds, and there is a real necessity in the basic theory course for beginning at the beginning. The first essential in the graduate school is to provide a common core of basic economic theory which the student can master and utilize as a basic tool in the rest of the economics courses which he may take. It is probably true that students coming from good undergraduate colleges and universities where they have had training at a high level in economic theory may be able to get more out of this course initially. There is some evidence, however, that the bright student even with quite inadequate background in economic theory may be able to catch up if the course really begins at the beginning.

The more serious gaps in graduate students' backgrounds often lie in the area of their preparation in mathematics and their training in languages. Lack of proper mathematical background slows the student down in his theory course and may even create serious mental blocks. At a great many universities students are now required to demonstrate a given level of mathematical proficiency as part of their graduate training. In some cases they are encouraged to go to summer school before entering to fill in gaps in their mathematical training. In other cases special math courses are provided concurrently with graduate training. As for languages, it is unfortunately true that many graduate students find themselves coming up against the language requirement for the Ph.D. with totally inadequate preparation, with the result that they have to take time off from their economics studies to study one or sometimes even two languages. It is these auxiliary tools which may cause the poorly prepared student either to flounder or to spend a not inconsiderable portion of his time in graduate school in trying to make up his deficiencies. As it now stands, therefore, it is not the undergraduate training in economics which is the major element in the student's preparation for graduate training in economics. Rather the student who is well prepared will be one who has the preparation in related disciplines which he can use as tools in his graduate program.

The most significant role of an undergraduate major in economics lies in getting the student interested in professional economics in the first place. At some juncture in the undergraduate program there must be a place where the good student can be exposed to the kind of economics which represents the core of the profession. The purpose of such exposure should not be primarily to prepare the student for graduate work in the sense that it gives him the necessary basic tools required for graduate performance. Rather it should provide a general orientation and point of view. This does not mean, however, that it should not be rigorous, analytic, and abstract. In a great many cases it is precisely this sort of training that will attract the highest caliber student into the profession.

The Role of the Undergraduate Major for Graduate Training in Economics. The question still remains, however, whether there is any way in which the undergraduate major can or should be altered in order to be of greater use in graduate school. As pointed out above, the undergraduate curriculum serves a wide variety of purposes. Economics majors are only a part of the students taking the courses in such a curriculum, and of the economics majors only a few of those at the honors level can be expected to go on into graduate work in economics. Given these constraints it is not reasonable to suppose that one can shape the undergraduate curriculum primarily to the needs of a graduate program. It is very important, however, to provide at some juncture in the program exposure of the top-level economics majors to professional economics as it is conceived by professional economists. Generally speaking, this exposure should be confined only to the honors students, but they should get it at a point before they have decided on their future career. For this reason it is probably useful to provide such a course at the sophomore or junior year to those students who have already had elementary economics and have shown sufficient interest in the field to become majors. There should probably be some follow-up after the junior year so that those students who have shown sufficient interest and flair for economics might have more opportunity to pursue this further. This could be accomplished by permitting them, after receiving a high mark in a rigorous undergraduate honors theory course, to enroll in selected courses at the graduate level, or by providing special tutorial or research projects. Such a device would provide additional contacts so that the student in his senior year would be more capable of making a decision on graduate training.

But from the point of view of graduate training itself, the most basic requirement is that students should acquire at the undergraduate level the necessary training in fields other than economics. Potential applicants to graduate school should be urged to take a substantial amount of mathematics and to achieve reading competence in several languages. Beyond this it would be useful for them to have background in the other social sciences and in the humanities and sciences so that when they come to graduate work in economics they will be well equipped and can concentrate on the mastering of economics itself rather than be distracted by the necessity of filling in gaps in their background.

DISCUSSION

ROYALL BRANDIS: I must confess that in the interim between receiving the invitation to be a discussant on this program and the arrival of Professor Haley's manuscript I looked forward eagerly to the prospect of reversing my customary relationship with Professor Haley and rejecting *his* manuscript. If a note of chagrin runs through this introduction, it is because I find myself almost entirely in agreement with Professor Haley and must, in all honestly, accept his manuscript.

There is, however, an omission from Professor Haley's remarks on the elementary course to which I wish to draw attention. Professor Haley says (and I think we would all agree) that ". . . few instructors in the subject are happy with the course as it now is." But he offers no explanation other than that of "cultural lag" and poor textbooks for this phenomenon. Since it is a rare institution in which a noneconomist dictates the content of the beginning course or the textbook used, the basic question which Professor Haley has not answered is why economists persist in their unhappy ways. One may be impolite and ask Professor Haley if his own university offers its students the eminently sensible introduction to our field which he has outlined in his paper.

I suggest that observation of who teaches the beginning course in our universities is not likely to give the impression that the leaders in our profession consider it to be an important responsibility. A survey of the universities which give the doctorate in economics would likely show that most student contacts with teachers in the elementary course are with graduate students or instructors. Other student contacts are with permanent faculty largely drafted for the "chore." I confess at once that this is the case at the University of Illinois.

It has not always been thus. Fifty years ago the University of Chicago policy was that the beginning course in economics must be taught by members of the permanent staff who also gave advanced work. The permanent staff of the department was, at that time, devoting 36 per cent of its teaching time to the elementary course. In addition, these men met several times a week to discuss methods and principles and some found themselves spending whole afternoons in individual conferences with their elementary students. At the same time, at the University of Michigan, F. M. Taylor, after twenty-five years of teaching, was spending seven hours a week in principles classrooms and much additional time working on new methods and new content for the course.

I do not intend to argue that these arrangements were the most efficient allocation of time from the viewpoint of advancing knowledge in our discipline. What I am saying is that university students in those days must have received a very different level of instruction in the principles course than they are likely to receive today. Economists, above any other academic group, should be aware of the principle involved in allocating resources. We cannot have it both ways.

The timing of the change in attitude of the profession toward the principles course suggests than an important reason for the change was the very different attitude of the generation of economists first trained as specialists in economics from that of the earlier generation which had been their teachers. To a man trained originally in the classics like Taylor, teaching economics, even at the elementary level, must have given a sense of life and excitement that few men holding the Ph.D. in economics are likely to experience. In any event, by 1923, Frank Fetter was saying that, "in many colleges with large elementary classes, there is no one even of the younger professors who is interested in the teaching of the general course." Need we change a word of Fetter's statement in 1961? The liberal arts colleges today are in a far better position than the major universities to offer undergraduates an elementary economics course that becomes a valuable part of their college education. One hopes that their faculties do not adopt the attitude toward this course that is all too common in the universities.

Professor Ruggles' paper suggests to me that we may be approaching, if we have not already entered, a second stage in which economics faculties in the universities will no longer be interested in teaching advanced undergraduate courses since these must perforce be designed for students who either are not concentrating in economics or, if they are, do not plan to go into graduate work in the field. Not long ago, I read the application for a university teaching position of a young man who had not yet completed his dissertation but whose express interest was to teach graduate economic theory. The handwriting was not only on his application but on the wall also.

If this is the case I can think of no greater tragedy for our profession. A half century ago when the best minds in that profession were devoting a large part of their time to the elementary course and additional time to the upper-level undergraduate courses, one of the motivating factors was the sense of urgency in educating future citizens so that they might approach rationally the burning economic questions of that day. And what were those questions? Railroad rates, the tariff, and free silver. Can we say that the present-day problems of full employment, inflation, growth, and international economic relations are less crucial to students of our generation?

I wholly agree with Professor Ruggles that the undergraduate major in economics should not endeavor to teach students what they will learn in graduate school. However, we do not seem to arrive at this conclusion via the same route. Professor Ruggles feels we are driven to do this because so few students who take upper-level undergraduate courses in economics will go on to graduate school. Even if all the students in the upper-level courses were going on into graduate work, I think it would be unwise to try to give them that work as juniors and seniors. The specialized, highly technical work of the graduate school is most fruitful when based upon a broad, general education. The approach used in the courses offered in the major field should be in line with this aim.

Professor Ruggles has looked beyond the economics courses themselves to urge that potential graduate students obtain foreign language and mathematics competence at the undergraduate level. We can all, I think, second this suggestion. Too many graduate students today must lengthen their period of graduate study in order to make up these deficiencies. But they do make them up. Perhaps we should be more concerned about deficiencies in undergraduate education which do not have to be made up in graduate school. Of these, I think the most common and most serious is lack of thorough training, or, indeed, often any training at all, in modern natural science and its philosophy. The result of this deficiency in the recent past can be seen today at the highest stratum of economic theory where the assumption is implicit that Darwin, Mill, and Newton said the last word in these matters or, if they did not, that what has been said since 1900 in the philosophy of science is irrelevant to economics.

As I understand their papers, Professor Haley and Professor Ruggles are asking simply that courses and curricula be designed for those who will study in them. If their suggestions were to be adopted, the result would be a large number of college graduates who possessed at least the minimum understanding of economics requisite for intelligent citizenship, a somewhat smaller number who had gone beyond this level of attainment whether as economics majors or otherwise, and beginning graduate students who would be broadly educated persons when they entered graduate school, possessed of the kind of foundation for specialized training that many of them today do not have despite the long list of undergraduate economics courses on their transcripts. I fear that what is really needed to accomplish this is not a change of textbooks but a change of heart—a much more difficult matter.

KENNETH D. ROOSE: Professor Haley's comments on the desirable content for the elementary economics course seem very sensible to me. He stresses the importance of being much more selective in coverage while emphasizing the need for greater depth and understanding in the topics studied. Because he also believes that the needs of both majors and nonmajors cannot be served adequately in the same introductory course, he proposes that the beginning course be made less technical and designed for the nonmajor. I doubt very much that the major would lose greatly from taking such a course; for surely experience suggests that instructors in the first course have seldom been successful in getting even majors to grasp the significance of some of the advanced tools of economic analysis. Since we are unsuccessful, why keep on trying? Why not do as Professor Haley recommends: develop the minimum micro- and macroeconomic theory that is necessary to evaluate and understand selected vital economic problems?

Inasmuch as I concur with Professor Haley in his recommendations that our objectives for the elementary course should be to provide an understanding of how the economic process works and to assist students in acquiring a way of thinking about economic issues, I would like to use the remainder of my comment on his paper to speculate about how these two objectives may be achieved.

It seems to me that the significance of economic theory is best developed around pressing economic problems. Thus, as Professor Haley suggests, the agricultural problem might provide the ideal area in which to develop the concepts of supply and demand, shifting of supply and demand curves, elasticity of demand and supply, etc. By studying such a problem, it should be possible to master an elementary facility with demand and supply tools of analysis, to grasp the essentials of the allocation mechanism of an enterprise economy, and to gain some appreciation of the economist's way of looking at problems.

Although it may be that I am falling into the trap of insisting that the beginning student must know everything before he can know anything, I wonder whether Professor Haley's course would not benefit from being treated as a whole rather than in two parts as he suggests. In my judgment, an effective way for students to learn how the economic system works is to learn how the economist looks at and analyzes economic issues or problems. Suppose, for example—to use two of Professor Haley's currently important problems or issues—we were to begin the study of economics by asking each student to write a brief paper on "Inflation: Is It Compatible with Economic Growth?" It is obvious, of course, that most of the short papers would be very superficial. Nevertheless, the student's immediate interest in economics is likely to be enhanced as he concentrates his attention on these highly significant current problems. Moreover, when the inadequacies of his paper become apparent, the student quickly senses the need for additional economic information and for systematic economic theory and analysis in order to improve his comprehension of the issues. It takes little more than this first paper to convince the student that a more satisfactory treatment of the topic requires the development of national income and employment theory, an understanding of the contributions of the banking system to monetary and economic stability, a knowledge of the role of fiscal policy, etc. In this way, the student has incentive to learn how to relate the theory to the problem, which should illuminate not only the way that the economic system works but how the economist dissects economic problems. Thus, this question on inflation and economic growth can provide an especially good area of investigation in which to develop macroeconomic theory.

By using the same kind of approach, it should also be possible to obtain a minimum understanding of the demand and supply tools of analysis. Broad topics covering demand and supply relations in agriculture and other areas can be designed. If these topics are to be analyzed in an intelligent way, the student must understand important concepts of microeconomics such as movements along and shifts in demand and supply curves, time periods of production, opportunity costs, elasticity, etc.

My final comments on Professor Haley's paper relate to the question of textbooks for more imaginative courses in elementary economics. Here, although I certainly share his hope that textbook writers soon will be more adventuresome and will break away from the present mold of monopolistic competition in their writings, I find myself less discontented than he with some of the present offerings; for I have found it quite easy to use selected chapters from one of the current best sellers in order to teach economics by blending economic analysis and problems. These chapters, of course, must be supplemented by intensive use of library sources: current periodicals, topical books, government and private reports, and the like. The very fact that textbooks normally treat many of these topics superficially turns out to be beneficial if students develop their knowledge of library resources, as a consequence, and learn to discriminate in their selection of materials as they explore the various issues in depth. For we must hope that students will emerge from elementary economics sufficiently familiar with both economic reasoning and sources to pass qualified judgments upon the changing economic problems that will be encountered during the decades lying ahead. It seems to me, therefore, that while there clearly is need for more choice in textbooks—for textbooks that are at the same time more selective and intensive in their coverage—the instructor's critical decision is whether he is prepared to restrict coverage and to increase depth.

My few remaining remarks are addressed to Professor Ruggles' paper. His assessment of the general character of undergraduate economics programs agrees with my own appraisal of the situation. Certainly most upper-level courses do not build upon the earlier courses in economic analysis. I wonder, however, whether an attempt should not be made to structure more upper-level courses which in fact do require the use of macro- and microeconomic tools at a fairly sophisticated level. I also concur heartily in his recommendations that undergraduates who contemplate graduate training in economics should develop their competencies in mathematics and foreign languages. In fact, recently I have gone so far as to suggest to students that they would make more rapid progress in graduate economics if they chose their undergraduate major in mathematics rather than in economics.

Carl M. Stevens: Let me remark at the outset that I agree with many of the major points made by Professors Haley and Ruggles in their excellent papers. For example, I agree with Professor Haley that a fundamental difficulty with the typical introductory course (my own included) is that it tries to cover too much territory in the time provided. Also, for example, I agree with Professor Ruggles that, from the point of view of the relation of the undergraduate major to graduate economics, the most basic requirement is that students should acquire at the undergraduate level the necessary training in fields other than economics. That I do not further discuss these points reflects in part the circumstance that traditionally it is not the function of a discussant to elaborate upon such points of agreement beyond, perhaps, remarking, as I have done, upon the fact that there are such.

Professor Haley attributes the characteristic broad coverage of the introductory course to the attempt to serve two objectives simultaneously: (1) to prepare the prospective economics major for advanced work; (2) to provide other students (frequently identified as "terminal" students—in spite of the rather grisly clinical connotation of that term) ". . . with that understanding of economics that all students should have '. . . as an essential part of a liberal education and a preparation for responsible citizenship.' " To make the problem of course design more tractable, he suggests that we abandon the first of these objectives. As I interpret his suggestion, I would go along with Professor Haley in this. He then suggests that we organize the course around the second of these objectives.

However, I would distinguish additional objectives to be assigned to the introductory course. Professor Ruggles suggests one of these when he stresses the role of the undergraduate major in getting the student interested in professional economics in the first place. Although he does not assign this role to the introductory course, I would assign one rather like it to that course. Put briefly, the course should provide enough of a "feel" for the kind of intellectual activity involved in being an economist so that the student can make a somewhat informed decision whether he might be interested or disinterested in a career as a professional economist. Another set of objectives is suggested as a sort of corollary of one of Professor Ruggles' major points. Economics courses, including the introductory course, have important special functions to serve in connection with students headed for graduate work and careers as professional social scientists in disciplines other than economics. (I would like at this point an opportunity to read a paper titled: "Relation of Undergraduate Economics to Graduate Social Science Other Than Economics.") Beyond this, the course has special objectives to serve in connection with the natural science major for whom the course may be virtually the only contact with social science.

There is not room in the short compass here provided to discuss the content requirements imposed on the course by these additional objectives. This enumeration of them is, however, pertinent to my following argument.

Generally, I would agree with Professor Haley that one strategy which will simplify the problem of course design is to reduce the number of course objectives we attempt to serve with any given amount of course time. However, even with desirable elimination of objectives, the introductory course will remain a multi-objective operation. In part for this reason, I would like to suggest that additional course design strategies merit consideration.

One of these is the following: Course design will be greatly facilitated if we abandon the notion that the course must be homogeneous in design—in the sense that each of its parts must serve the same objectives with equal efficiency. Since I have developed this point elsewhere, I will take space for only one (unexplicated) example. Take the (not uncommon) case in which a decision has been made with respect to the course as a whole to de-emphasize formal theoretical treatment of topics. Such a decision, while it will set the general design of the course, need not commit the instructor to a de-emphasis of formal theory in every part of the course. Indeed, a number of important particular objectives (for example, the additional course objectives I have enumerated) may be served by selecting one or two parts of the course in which to do just the reverse; that is, in which to emphasize formal theory.

Turning now to the second of the objectives identified by Professor Haley, I must confess that some implications of it have for long troubled me. For one thing, if we take this objective as seriously as frequently we seem to—that is, if we really believe that the discipline of economics contains material an understanding of which is an essential part of a liberal education and essential for responsible citizenship—then surely each of us should be insisting before the curriculum committee of his institution that an economics course containing this material be required of all students. Such a requirement does not now generally obtain. (Professor Ruggles estimates that between 50 and 75 per cent of undergraduates usually take the basic elementary course in economics, a figure which was surprisingly high to me.) If such a course were instituted, we would have in the curriculum two introductory courses: (1) a required general education course, perhaps as one part of an interdisciplinary social science offering; (2) an elective course introductory to the upper division offerings in economics. A number of the functions comprehended by the second of Professor Haley's sets of objectives might be assigned to the first of these introductory courses. As I have tried to suggest, however, this will leave us with no dearth of objectives to assign to the second of the introductory courses.

Whatever, more generally speaking, the merits of this two-introductory-courses approach, one significance in this context is that it does suggest another course design strategy alternative to reducing the number of course objectives. This is to increase the amount of course time devoted to serving whatever bundle of objectives we deem important.

The two-introductory-courses approach does demand at least passing reference to an additional matter: the relation between high school economics and college economics. The recent report of the National Task Force on Economic Education emphasizes the relation between economic understanding and responsible citizenship, notes that the understanding developed in most high schools today is not adequate, and recommends devoting more time to, and generally upgrading, the economics offering in the high schools.

One implication of this report is that, as of today, the first of our two introductory courses may well be indicated. Another implication is that, as of tomorrow, this may no longer be true. That is, if efforts and recommendations such as those assayed by the Task Force succeed in significantly upgrading the economics offerings in the high schools (particularly the advanced placement types of courses available to the better college bound students), then many of the functions we might have assigned to the first of our two introductory courses (and which are currently assigned to many introductory courses) would be taken care of elsewhere. (The fact that I note this possibility as relevant to our topic does not imply any predictions about it or judgments upon it.)

THE MARKET FOR ECONOMISTS

THE SUPPLY OF ECONOMISTS

By EWAN CLAGUE *and* MORTON LEVINE
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Growth of the Profession and Its Implications for Supply

About 20,000 people were employed primarily as economists in 1961. Of this number, about one-half were employed by colleges and universities; approximately a third worked for government agencies —chiefly federal. A smaller but growing number of economists is employed by private industry and some serve in private research and community organizations. A few economists are self-employed, acting as consultants, mainly to business firms.

By the end of the sixties, employment of economists may grow by about 50 per cent, approximating 30,000 in 1970.[1] In addition to the 10,000 economists that may be needed for expansion, approximately 8,000 may be required to replace members of the profession who retire, leave the field for various reasons, or die.[2] These figures imply that a new supply of about 18,000 economists will have to be recruited into the profession during the sixties. In order to meet this demand for fully qualified economists, the nation's colleges and universities, particularly their graduate schools, will have to graduate considerably more than this number.

The supply of economics graduates with bachelor's degrees is expected to be considerably greater than the demand for professional economists with these minimal qualifications. Also, our estimates of the number of advanced degrees (master's and doctor's) to be awarded in economics during the sixties indicates that an adequate supply of fully qualified people will be trained during the decade. We can safely assume that virtually all the Ph.D. graduates in economics will enter the profession. But, as a recent nationwide follow-up study of 1958 college graduates demonstrates, only a fraction of the people with a master's degree in economics can be expected to enter the field. (This study, as well as the educational statistics underlying our conclusions, are discussed in the material which follows.) Thus, it appears that a deficit in the supply of qualified economists is probable during the sixties, unless there is a rise in the proportion of economics graduates with a master's degree entering the profession and more young people with bachelor's degrees elect to do their graduate work in this field. Otherwise, shortages may be anticipated in such fields as college teaching and research and among top economic advisers and consultants.

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[1] Based on research conducted by the Bureau of Labor Statistics in connection with its occupational outlook program. Some of the factors pointing toward growth in the profession are discussed in the employment outlook statement for economists, published by the Bureau.

[2] Replacement needs in this field are difficult to estimate since a current up-to-date age distribution for economists is not available. We have estimated annual replacement needs at 3 per cent, the minimum rate suggested for college teachers in the humanities and social sciences by J. F. Wellemeyer, Jr., and Pauline A. Lerner in their study entitled, "Higher Education Faculty Requirements in the Humanities and the Social Sciences, 1952-70."

Sources of Supply of Economists

The number of degrees in economics conferred by higher educational institutions for the past twelve years is shown in Table 1. Since 1947-48, bachelor's degrees in economics, as a per cent of all bachelor's degrees, has ranged from 2.2 to 3.4 and has averaged 2.6 per cent; for

TABLE 1

NUMBER OF DEGREES IN ECONOMICS CONFERRED BY HIGHER EDUCATIONAL INSTITUTIONS FOR THE TWELVE-YEAR PERIOD ENDING JUNE 1959

Academic Year	Total Degrees	Bachelor's	Master's	Ph.D.
1947–48	10,040	9,002	922	116
1948–49	12,548	11,536	863	149
1949–50	15,694	14,573	921	200
1950–51	11,529	10,484	809	236
1951–52	9,529	8,595	695	239
1952–53	8,117	7,313	582	222
1953–54	7,582	6,728	609	245
1954–55	7,222	6,364	617	241
1955–56	7,984	6,938	753	293
1956–57	8,555	7,393	849	313
1957–58	9,385	8,142	933	310
1958–59	9,586	8,314	982	290
Total	117,771	105,382	9,535	2,854
	Degrees in Economics as a Per Cent of Degrees Granted in All Subject Fields			
1947–48	3.1	3.3	2.2	2.8
1948–49	3.0	3.1	1.7	2.8
1949–50	3.1	3.4	1.6	3.0
1950–51	2.5	2.7	1.2	3.2
1951–52	2.4	2.6	1.1	3.1
1952–53	2.1	2.4	1.0	2.7
1953–54	2.1	2.3	1.1	2.7
1954–55	2.0	2.2	1.1	2.7
1955–56	2.1	2.2	1.3	3.3
1956–57	2.1	2.2	1.4	3.6
1957–58	2.1	2.2	1.4	3.5
1958–59	2.1	2.2	1.4	3.1
Total	2.4	2.6	1.3	3.1

SOURCE: U.S. Office of Education, Annual Reports on Earned Degrees Conferred by Higher Educational Institutions.

master's degrees, the comparable average for the past twelve years has been 1.3 per cent and for Ph.D.'s, 3.1 per cent. The statistics on the number of bachelor's degrees conferred are included in this discussion, since many people with only minimal qualifications in economics serve as a source of supply for beginning research positions in government and private industry, even though persons employed in such jobs are not usually regarded as professional economists. Furthermore, industrial and business firms often hire young people with bachelor's degrees in economics as management trainees and rotate them through various departments to acquaint them with company activities. Whether or not the employee is finally assigned a job which makes specific use of his training in economics depends largely on the company's needs.

Another, but very small, source of supply to the profession results from the immigration of professional economists to the United States. According to the Immigration and Naturalization Service, the number of economists admitted to the United States as immigrants rose from 44 in 1953 to 79 in 1960. These figures do not represent a net increase to the profession, because some of these economists subsequently left the U.S. Information is not available for the years prior to 1953. Also, we cannot determine from the statistics whether they have the theoretical background in economics needed to meet our standards for the profession.

Still another source of supply to the profession—one that cannot be measured statistically, however—relates to transfers that take place among people in the social sciences and from other fields such as mathematics and business and commerce. Most of this shifting probably occurs among economists employed in industry and government; on the other hand, there is less shifting among college faculties.

The Anticipated Rise in the Number of College Graduates and the Future Supply of Economists

By 1963, the U.S. Office of Education expects the number of college graduates receiving a bachelor's degree to reach 465,000—about 30,000 more than the all-time high reported for 1950. After 1968, the number of bachelor's degrees that are likely to be granted will exceed 700,000 a year. Similarly, the number of graduate degrees awarded during the 1960 decade is also expected to reach new heights. For example, U.S. Office of Education projections indicate that the number of master's degrees to be awarded may rise from about 75,000 in 1960 to almost 140,000 in 1970; also, the number of doctor's degrees awarded in 1970 is likely to be almost double the 9,700 conferred in 1960.

Should degrees in economics represent about the same proportion of all degrees as they have for the last ten to twelve years, a great increase in these degrees at all levels is in prospect. On this assumption, nearly 145,000 bachelor's degrees in economics would be granted during the decade, about 13,000 master's degrees, and about 4,500 Ph.D. degrees. (See Table 2.) During the first half of the decade, bachelor's degrees awarded in economics would average about 12,000 a year, master's degrees 1,100, and Ph.D. degrees 370. During the latter part of the decade the comparable averages would be 16,000 a year, 1,500, and 500.

Factors Affecting the Supply of New Graduates with Degrees in Economics

The projections of the number of degrees in economics that may be awarded at all levels during the decade are, by themselves, no indication of the trained supply that can be expected in this field. These figures do not take into account such factors as changes in career objectives, differences in labor force participation rates of men and women, or the fact that undergraduates often major in economics simply because they have a general interest in the social sciences or want to acquire an educational background suitable for an entry position in industry and business. Some current information on this subject is available from the results of the nationwide follow-up survey of the graduating class of 1958 conducted by Mrs. Laure M. Sharp, of the Bureau of Social Science Research, Inc., for the National Sci-

TABLE 2

PROJECTIONS OF BACHELOR'S, MASTER'S, AND DOCTOR'S DEGREES TO BE GRANTED IN ECONOMICS BY INSTITUTIONS OF HIGHER EDUCATION IN THE TEN-YEAR PERIOD, 1960–61 AND 1969–70 (AGGREGATE UNITED STATES)

Academic Year	Bachelor's*	Master's†	Doctor's‡
1960–61	10,556	1,023	326
1961–62	11,180	1,024	353
1962–63	12,090	1,088	381
1963–64	13,338	1,179	394
1964–65	13,884	1,301	409
1965–66	13,936	1,359	434
1966–67	14,586	1,361	471
1967–68	17,082	1,426	512
1968–69	18,486	1,668	539
1969–70	18,668	1,807	561
Total	143,806	13,236	4,380

* Based on 2.6 per cent of total bachelor's degrees.
† Based on 1.3 per cent of total master's degrees.
‡ Based on 3 per cent of total doctor's degrees.
(Proportions in footnotes are based on average for twelve-year period ending 1959.)
SOURCE: Bureau of Labor Statistics estimates based on U.S. Office of Education's degree projections.

ence Foundation. This comprehensive survey covers graduates who received the bachelor's or master's degree in 1958 and takes a look at their educational and employment status as of 1960 and the relationships which obtain between their undergraduate studies, their graduate studies, and their work. All fields of specialization are represented by these graduates.

Of the 959 graduates in the sample who received bachelor's degrees in economics in 1958, 847 were men and 112 were women. About 30 per cent of the men and nearly 20 per cent of the women enrolled in graduate schools following their graduation in 1958. By 1960, about 10 per cent of these students had already received a master's degree. It is interesting to note that more of these economics graduates received advanced degrees in business and commerce than in any other specialized field. The second highest number of people who had received master's degrees by 1960 concentrated in economics and the remainder were distributed in a variety of fields, including agriculture, education, law, and mathematics.

Slightly less than 100 of those who received bachelor's degrees in 1958 were M.A. candidates in 1960. Economics was most frequently specified as a major but almost as many people were concentrating their advanced study in business and commerce. Other fields of specialization frequently mentioned by M.A. candidiates were education, the humanities and arts, and other social sciences.

Nearly 100 persons included in the survey received a master's degree in economics in 1958. About half had majored in economics as undergraduates, about one-fifth in business and commerce, and the remainder in such diverse fields as agriculture, mathematics, philosophy, engineering, education, history, and psychology.

About one-fourth of those who received a master's degree in 1958 were candidates for a Ph.D. degree in 1960, mainly in economics, though there was one case in which a candidate stated his major was speech and drama.

These figures on the relationships between undergraduate and graduate specialization serve to emphasize the point made earlier that undergraduates who major in economics often do so without regard to vocational objective. Those who have definite career objectives in mind for employment as professional economists usually pursue economics at the graduate level. These people, particularly those at the Ph.D. level, are the ones the profession can look forward to as the prime source of supply. These figures also indicate that business and commerce is a major field of graduate specialization for bachelor-degree holders who major in economics. This is not surprising since, as has already been noted, there are many jobs in industry that require the professional services of people with a background in economics.

This survey also gives us some current information on the kinds of occupations the 1958 graduates who majored in economics held in 1960. At the bachelor's level the diversity of job titles is great and highlights the fact that the bachelor's degree does not usually qualify one for professional employment as an economist. Out of a total of 645 persons who received bachelor's degrees in economics in 1958 and were employed in 1960, the greatest single number (129) were employed in business and managerial occupations and 109 were employed as salesmen. Only 18 persons reported that they were employed as economists, 4 more than reported themselves as personnel workers, and 8 less than who reported themselves as secretarial or clerical workers.

Business and management occupations were most frequently reported by master's degree recipients, though the number in these jobs was only slightly more than that for economists. Those who reported themselves as being employed as economists represented a higher proportion (13.9 per cent) than was the case for graduates with a bachelor's degree in economics (2.8 per cent). This is what we would expect. It is interesting to note, however, that even at the master's degree level of proficiency, graduates who majored in economics reported themselves as being employed as public officials, secondary school teachers, and as college teachers in fields other than the social sciences.

This follow-up survey demonstrates, as have earlier studies, that except for the licensed professions, engineering, and teaching, the relationship between area of specialization in college, particularly at the bachelor's level, and subsequent field of professional employment is not always direct. This point was also noted by Dr. Dael Wolfle in his book, *America's Resources and Specialized Talent.* Although Dr. Wolfle did not single out economists, he demonstrated that of all the people who received degrees in 1951 in the social sciences, only 13 per cent entered professional employment that year in the field. Dr. Wolfle also noted, however, that the number of people entering business and commerce in 1951 was 23 per cent greater than the number of degrees awarded in business and commerce that year at all levels. Perhaps this is where many of the graduates who majored in economics and other social sciences went.[3]

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[3] Data on the "Employment Outlook for Economists" in the *Occupational Outlook Handbook,* 1961 edition (Government Printing Office, Washington, D.C.).

THE DEMAND FOR ECONOMISTS

By Francis M. Boddy
University of Minnesota

One of the difficulties in discussing any aspect of the market for economists is the absence of a specification as to what an "economist" is. One way to move toward such a specification would be in terms of the undergraduate or graduate training of such persons, in terms of the major field and level of degree achieved.

While specific training in economics at the college or university level is generally a prerequisite to employment as an economist, the specialized training represented by a bachelor's or even a master's degree with a major in economics does not seem to commit the holders to entry or continuation in professional work in the field.

A report of a survey of alumni of Columbia University, Graduate Economics Department, illustrates this situation. Of the holders of the M.A. who received their degrees before 1950, almost two-thirds were noneconomists (a small number of them were housewives), while of those who received their M.A. after 1950 almost one-half were noneconomists, at the time of the survey.

The demand for economists comes mainly from three areas: the colleges and universities, government, and business and industry. The 1959 *Occupational Outlook Handbook* reported that one-half of the professional economists were employed by colleges and universities, about one-third by government agencies, and a small but growing number by private industry. In addition, a few were employed by research agencies and community organizations. This same report forecasts that there will be a need of some 600 to 700 new instructors annually in colleges and universities during the decade of the sixties, and that several hundred annually will be demanded in other fields.[1]

A National Education Association report titled, *Teacher Supply and Demand in Universities, Colleges, and Junior Colleges, 1959-60 and 1960-61,* estimates the demand for full-time teachers of economics in such institutions will rise from an annual number demanded of 650 in 1958-59 to an annual number demanded of 900 in 1969-70.[2] Of the new full-time teachers in the social sciences entering employment by colleges and universities in 1959-60, 35 per cent held the doctor's degree and an additional 31 per cent had at least a year's training beyond the master's degree.[3] These estimates would imply an annual demand for Ph.D.'s in economics by colleges and universities on the order of 200 or so at the present time, and rising to some 300 or so by 1969-70, with the remainder of the rising demand for teachers of economics being satisfied (or directed towards) those economists with lower levels of degree achievement.

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[1] *Occupational Outlook Handbook,* 1959, p. 150.

[2] Higher Education Series, Research Report 1961-R12, p. 55.

Given the unstandardized product, especially at "below the Ph.D." levels, it is not surprising that price information of a meaningful sort is not available. If one confines oneself to a restricted segment of the market (the leading college and university departments of economics) and to the holders of the Ph.D., however, some information of interest is available that supports the general conclusions above that the market has been largely an academic market (at the Ph.D. level) and does give some indication of the trend of the relative prices of economists.

I have, over the past six years, conducted an informal survey of some 30 of the leading departments of economics in the country, defined largely as being those departments which have been major producers of Ph.D.'s in economics. A few major producers are not included, however, and only "general economics" departments were included (not departments of agricultural economics or economics groups in schools of business administration, if separate from the "general economics" departments); so this group is neither a complete coverage of major departments nor is it a representative sample of all "economics" departments. This year I also surveyed the same departments as to the market to which their recent Ph.D.'s were going and as to the chairman's opinions on the state of the market at the present time (December 1961).

The results of the survey as to the area of employment of their recent Ph.D.'s in economics are given below in Table 1. The percentages listed are for those whose positions were known. Some 5-12 per cent of the total Ph.D.'s (the N's in the Table) fall in the unknown position class.

These 23 departments whose responses are included granted about three-fourths of all the Ph.D.'s granted by all United States institutions. An Office of Education[4] report listed 221 earned Ph.D.'s, in economics in 1958-59, while the National Education Association report showed 455 earned Ph.D.'s in economics in the two years 1958-59 and 1959-60.

The per cents of Ph.D.'s going to college or university faculties

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[3] *Ibid.*, p. 61.

[4] *Earned Degrees Conferred 1958-59*, pp. 165-69, Office of Education Circular No. 636, 1961.

TABLE 1

PER CENT OF RECENT PH.D.'S IN ECONOMICS* IN LISTED PROFESSIONAL POSITION

	PH.D.'S GRANTED IN 1954–56 N=270		PH.D.'S GRANTED IN 1959–61 N=330
	Initial Position	Position Fall 1961	Position Fall 1961
College or university faculty	74.4	68.6	75.0
Business and industry	10.9	13.7	10.8
Government	10.2	11.7	10.2
Nonprofit foundation or research organization	4.0	5.2	2.8
Other	0.4	0.8	1.3
	99.9	100.0	100.1

* From 23 leading departments of economics. Those whose positions were unknown were not included in the calculation of the percentages, but are included in totals (N=270, 330) above the columns.

(68.6 to 75.0) shown in Table 1 are quite similar to the 77.4 per cent shown by a study of the earned Ph.D.'s of 1958-59 and 1959-60 included in the National Education Association report.[5] The per cent going to government, 10.5 per cent, and to business and industry, 8.0 per cent, as shown in the NEA report also closely match the proportions shown by Table 1.

If one looks back to earlier data, there is an apparent increase in the proportions now going into college and university faculties. The proportions shown in the Bowen report on *Graduate Education in Economics*[6] for Ph.D.'s received from 1930-31 to 1939-40 were: 60 per cent to college and universities, 23 per cent to public agencies, and 8 per cent to private agencies. The shift seems to be from government to colleges and universities as compared to the decade of the thirties, for what would seem to be obvious reasons, given the conditions of the thirties.

Such evidence as can be pulled together suggests, then, that the bulk of the demand for the Ph.D. level of economists has come, and is likely to continue to come, from the academic sector of the market, with perhaps some 10 per cent or so each from the government and the business and industry sectors and a small remainder from other sectors.

While the output of Ph.D.'s seems to have reached a peak in 1956-57 (about ten years after the G.I. rush began) at about 300 per year, recent output seems to be at a lower level, in spite of an annual rate of increase in the number of graduate majors in economics in 27 of the leading departments of 9.4 per cent per year from 1956-57 to 1961-62.

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[5] *Ibid.*, pp. 83, 85.

[6] *A.E.R.*, Sept., 1953, Pt. 2, p. 11.

Given the rising demand that has been with us for some years and the potentially rising supply indicated above, what has been happening to relative prices in the market for economists at the Ph.D. level and at academic levels generally?

From my survey of the median salaries, by rank, in some 30 leading departments of economics, annual average rates of increase in the means of these median salaries were computed. From the biannual survey of salaries in 41 institutions made by the AAUP and from Office of Education reports, rates of increase in academic salaries in all fields combined, by rank, for roughly comparable groups of institutions could be computed. The results are tabulated in Table 2.

TABLE 2

ANNUAL AVERAGE RATES OF INCREASE IN ACADEMIC (9–10 MONTH) SALARIES, PER CENT PER YEAR, 1957–58 TO 1961–62

	INCREASE: PER CENT PER YEAR
Professors	
Office of Education data, 1957–58 to 1960–61, Large Institutions, All Staff*	7.4
AAUP data, 1957–58 to 1961–62, All Full-Time Staff†	6.3
25 leading departments, 1957–58 to 1961–62, Economics Department only	5.6
Associate Professors	
Office of Education data, 1957–58 to 1960–61, Large Institutions, All Staff	5.7
AAUP data, 1957–58 to 1961–62, All Full-Time Staff	5.5
22 leading departments, 1957–58 to 1961–62, Economics Department only	4.4
Assistant Professors	
Office of Education data, 1957–58 to 1960–61, Large Institutions, All Staff	4.9
AAUP data, 1957–58 to 1961–62, All Full-Time Staff	5.5
24 leading departments, 1957–58 to 1961–62, Economics Department only	4.7
Instructors	
Office of Education data, 1957–58 to 1960–61	3.8
AAUP data, 1957–58 to 1961–62, All Full-Time Staff	6.1
13 leading departments, 1957–58 to 1961–62, Entering Salary: New Ph.D.'s in Economics	5.4

* Unweighted means of four groups of institutions, public and private, enrollment over 5,000. Office of Education Bulletins, *Higher Education Planning and Management Data*, 1957–58, 1958–59, 1959–60, 1960–61.

† Unweighted means of four groups of institutions (large sized, public and private) mean of medians. AAUP *Bulletin*, winter numbers, 1961, 1959, 1957.

While the rates of increase of economists' salaries at all levels of rank range from 4.4 to 5.6 per cent per year, in each of the ranks above instructor both sets of data for academic salaries in all fields show a still more rapid rate of increase than for economists; and at the instructor rank, the "new Ph.D's in economics" salaries are not rising as fast as the AAUP data show for instructors, nor as fast as the rise in general salaries of assistant professors shown by the AAUP data.

On the whole, then, the market for Ph.D.'s in economics and for economists at higher academic levels is strong, with annual rates of price increases (5.0 per cent) which would double salaries in fourteen years. Nevertheless, it seems to be but a reflection of a strong academic market generally, for economists' salaries are not quite keeping pace with academic salaries in general—at least at the larger institutions. However, salary levels of economists are, on the average, above the levels of general academic salaries in the same institutions by perhaps 5 to 10 per cent.

The future demand for economists, at the Ph.D. level, will, I believe, continue to be dominated by the academic sector of the market, and all indications are that it will continue to be strong or to gain strength as the new rush of students to colleges and universities really takes hold and as (I believe) more continue into graduate level work. Since the supply is bound to be sluggish (with an input of some 150-200 Ph.D.'s per year as all that can be expected) with the present numbers of economists qualified for college and university faculties already largely in these institutions, I expect that academic economists' salaries will continue to increase for at least five years or more at least 5 per cent per year, which is more than double the rate of increase in real incomes per capita that is likely to occur in the country as a whole.

My survey of "market opinions" of department chairmen of some 24 responding departments of economics is summarized in Table 3.

TABLE 3

NET SCORES, EXPRESSING AGREEMENT OR DISAGREEMENT, TO SOME MARKET OPINION STATEMENTS, BY CHAIRMEN OF MAJOR DEPARTMENTS OF ECONOMICS, DECEMBER, 1961

Statement: "It is my opinion that"	Score
1. We are currently having difficulty in placing our "just completed" Ph.D.'s in satisfactory positions	−1.5
2. We are finding more difficulty currently than we did five years ago in satisfactory placement of such Ph.D.'s	−1.5
3. The market situation is likely to be more favorable for placing "just completed" Ph.D.'s in the next five years than it was in the past five years	+1.1
4. The real income of "just completed" Ph.D.'s (in their first position) will, in the next five years, rise at a rate more than twice the rate of increase in real national income per capita	+0.4
5. The average real income levels are *all* economists (not just the recent Ph.D.'s) will in the next five years rise at a rate more than twice the rate of increase in real national income per capita	+0.1
6. The supply of economists is likely to increase so rapidly that the income levels of "just completed" Ph.D.'s is likely *not* to even match the increase in real national income per capita in the next five years	−1.4
7. The demand for Ph.D.'s will, in the next five years, come in even greater proportions from academic institutions	+0.4
8. The market for "just completed" Ph.D.'s does not indicate the strength and direction of the demand for "economists" as a whole	+0.2
9. The market for Ph.D. (economists) is stronger than for Ph.D.'s in most other fields	+0.6
10. It is quite likely that salaries for economists will increase (in real terms) at a rate sufficiently high to attract a good proportion of the best minds among the graduate students to this field	−0.1

THE FUNCTIONING OF THE MARKET FOR ECONOMISTS

By GERALD G. SOMERS
University of Wisconsin

If the proper study of mankind is man, then the proper study of market economists is surely the market for economists. In decrying the imperfections of other product and labor markets, we would be delinquent without an occasional look at our own.

In a session similar to this one held three years ago, questions were raised concerning the adequacy of the market mechanism in the various fields of economics. Although there were many cries of alarm, rejoinders, debate and suggested solutions, a principal conclusion drawn from that discussion was that little objective data existed on the actual functioning of the market for economists. In the ensuing period some effort has been made to fill the gaps, and even though the new information is not sufficiently definitive to lay all controversies to rest, we are now able to give them a somewhat more substantial factual base.

There are two basic questions we would want to raise concerning the functioning of the market for economists: (1) What is the structure of the market: the patterns of mobility, the channels through which job information is communicated and job seekers allocated to employment opportunities? (2) How adequate are the market mechanisms and what improvements, if any, would be desirable?

Market Structure, Mobility Patterns, and Information Channels

Within the national market for economists, the channels of job information and job movement are structured within three major sectors of employment: academic, government, and industry. Within the academic field there is further Balkanization. Reasonably clear demarcation lines based on the size and prestige of institutions are discernable in the general patterns of job knowledge and mobility.

Although a significant number of the surveyed economists had crossed from one sector of employment to another during their professional careers, almost half had experience in only one field. The academic field was considerably more important than government or industry in their total work experience. In a recent survey of 280 economists, 90 per cent had worked in colleges or universities at some time during their careers, compared with 58 per cent who had had some experience in nonacademic employment.[1] Of the 200 economists who were in academic institutions at the time of the survey, 59 per cent had always been in academic work, whereas only 19 per cent of the 80 economists currently employed in other fields have always worked in that particular field.[2] These results accord closely with the experience of chemists, biologists, and physicists with Ph.D. degrees. In a study of these scientists conducted by the Bureau of Labor Statistics, 58 per cent currently employed in academic work have always been academicians, and 20 per cent of those employed in other fields have always worked in that particular field.[3]

When seen from the viewpoint of the recent experience of academic economics departments rather than the lifetime careers of established economists, the educators have less grounds for optimism. There is some evidence of a recent net loss to nonacademic sectors through mobility, even though movement of mobile academicians is still primarily within the academic sphere. In a survey of 349 economics deportments recently completed by Professor Howard Marshall, it was found that 405 members had left positions in responding departments in the preceding three years for work elsewhere. Of these, 139, a little over one-third, went into nonacademic work and the remainder took other teaching positions. During the same period, these economics departments added 367 staff members who had held positions elsewhere (excluding those who came directly from graduate work). Of the new additons, 95, approximately one-fourth, came from nonacademic sectors and three-fourths from other teaching positions.

The patterns of mobility within and between the academic, government, and business sectors are undoubtedly influenced by differences in job duties and working conditions as related to interests of the economists and their motives for mobility. When asked the main reasons for which economists move into the academic field from business, industry, or government, the three major factors cited in the 1960 survey of economists were, first, the attractions of the academic way of life (including its pleasant working conditions and intellectual associations), second, the opportunities for independent study, research, and writing, and, third, the interest in or devotion to teaching. As general motives for the reverse movement, from the academic field to government and industry, the most important was higher salary, listed by all without exception. Second in importance was the opportunity for challenging and practical work and, third, the relative prospects for advancement.[4]

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[1] Of the 6,227 economists listed in the 1956 *Handbook of the American Economic Association*, 2,361 were also included in the *American Men of Science, A Biographical Directory*, IX ed., Vol. III (New York, 1956). A sample of 440 economists was randomly selected from this group for purposes of the questionnaire survey. Usable questionnaire completions were returned by 280, of which 200 were employed in academic institutions at the time of the survey and 81 per cent had Ph.D.'s. Detailed results of the survey are described in V. Anantaraman, "Occupational Mobility of American Economists: A Report on the Survey of Patterns and Factors in Their Mobility" (unpublished Ph.D. dissertation, University of Wisconsin, 1960). The results of the survey are also summarized in "Mobility of Professional Economists in the United States" (mimeographed; Industrial Relations Research Center, University of Wisconsin, 1961).

[2] Anantaraman dissertation, p. 60.

[3] *Occupational Mobility of Scientists: A Study of Chemists, Biologists and Physicists with Ph.D. Degrees*, Bulletin 1121, U.S. Department of Labor, Bureau of Labor Statistics, 1953.

The academic and nonacademic submarkets can also be defined through similarities and differences in sources of job information and hiring channels. In all three sectors—academic, government, and industry—most of the job information is obtained and hiring conducted through informal and somewhat esoteric procedures, with a relatively small minority of the job placements accomplished through "public" media such as placement bureaus, employment agencies, or advertising. Rather than a meeting of applicants and openings in some central organized bourse, the market exchanges and transactions tend to originate in a series of separate probes and searches by prospective employers and employees.

The 1960 survey of economists provided data on the initial sources of job information for 473 positions in the academic field, 159 government positions, and 100 business positions taken by the 280 economists during their careers.[5] In the academic sphere, the respondents first learned of 29 per cent of the openings through an exchange of letters by department chairmen and/or deans, an equal number through friends, and 13 per cent by direct inquiry to the economist from the new employer. Seven per cent obtained their jobs by inquiries which they, themselves, directed to other departments, and the remainder through more formal hiring channels. The academic market is discussed further below.

In movement to the government sector, over two-thirds of the jobs were first brought to the attention of the respondents through direct inquiry or recruitment by the agencies involved. Knowledge of 9 per cent of the openings was obtained through friends and 6 per cent through inquiries initiated by the economists. U.S. Civil Service Commission recruitment accounted for 12 per cent of the jobs and other formal channels for the remainder.

In the business sector, too, respondents first learned of over half of the jobs through a direct inquiry from the new employer and an additional 9 per cent in recruiting trips by company personnel officers. Here, too, job knowledge gained through friends accounted for 10 per

[4] *Op. cit.*, pp. 109-15.

[5] *Ibid.*, pp. 86-91.

cent of the cases, but, in contrast with the other sectors, a higher proportion of business jobs (16 per cent) were obtained through initial inquiry by the employee, and 9 per cent of the jobs were first brought to the attention of the respondents through company advertising in journals and newspapers.

Thus, the economists' labor market, though national in scope, can be meaningfully viewed as a tripartite structure. Even though the academic, government, and business sectors are by no means noncompeting in the labor market and have many similar market characteristics, there are enough distinctions in job duties, mobility patterns, motivations for movement, and hiring channels to warrant a subdivision for practical and analytical purposes.

The Academic Submarkets

Within the academic market, submarkets can also be distinguished, based primarily on the size and prestige of universities. Unfortunately, prestige is an elusive concept and defensible prestige categories are not readily constructed. For this reason, the following analysis is developed in terms of size of institutions and the importance of graduate instruction. The extent to which these variables may be judged as proxies for prestige will be left to the imagination and courage of others.

With some trepidation, the country's largest graduate schools (i.e., universities turning out the largest number of Ph.D.'s in economics) are here designated as one important submarket in the academic market place. Although more or fewer might have been selected, the 26 largest graduate economics departments[6] were chosen because this number corresponds roughly with the number of departments which regularly exchange information on openings, salaries, and students available for faculty positions—the so-called "cartel."

Economists who have received their highest degrees at one of the largest graduate schools are much more likely than others to find a teaching job at one of the largest graduate schools. Even if they initially take positions in smaller universities after graduation, those who then move to one of the large universities are likely to have received their degrees at a large university.

In a questionnaire survey conducted earlier this year among 120 young economists who had just been appointed to instructor or assistant professorship positions,[7] the sample of respondents was about evenly divided between those who had received their highest degrees in the 26 largest graduate departments and those with degrees from smaller universities. Two-thirds of those who obtained jobs at the largest graduate schools had received their highest degree at one of the largest graduate schools. Whereas 45 per cent of the respondents with a degree from one of the largest graduate schools obtained jobs at one of these schools, only 20 per cent of those with degrees from smaller universities obtained jobs in the largest schools. These results are confirmed in an analysis of interacademic moves made during the careers of our well-established economists.[8] In a total of 47 moves to jobs at the largest graduate schools, 44 were made by economists who had received their degrees at one of these universities.

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[6] Based on information contained in U.S. Department of Health, Education and Welfare, Office of Education, *Earned Degrees Conferred in 1957-58 and 1958-59*, Circular Nos. 570 and 636. Washington, 1959 and 1961.

[7] Questionnaires were sent to 120 persons whose appointments to instructor or assistant professor positions were listed in the June and September, 1961 issues of the *American Economic Review*; usable replies were received from 92 respondents.

The Balkanization of the academic market can be seen in the fact that 40 per cent of the well-established economists leaving a job at one of the largest universities moved to another of these universities, and all but one of these economists also received his degree from a large university. Although 22 per cent of the economists who moved from jobs in smaller schools also took jobs in the largest universities, it is notable that all but two of these had earned their degree at a large university.

Professor Howard Marshall's analysis of losses suffered by economics departments in the last three years also shows some contrast in the fortunes of large and small institutions with regard to mobility. Whereas the smallest departments (one and two members) had a loss rate (the number who have left in the past three years over current full-time and part-time faculty) of 28 per cent, the largest departments (nine members and over) had a loss rate of only 17 per cent.[9]

The largest universities not only suffer fewer losses of economists, but they are able to attract those with higher degrees. In our survey of young instructors and assistant professors, 73 per cent of those who had taken jobs in the largest graduate departments had received their doctorates. Only 48 per cent had doctorates among those taking jobs in smaller universities. In the analysis of interacademic moves of the well-established economists, too, it is aparent that there is a significant relationship between the circles in which one moves and the degree he holds. All of those who had moved from a job at one of the largest graduate departments to another held the doctorate at the time of the move, whereas only 61 per cent had the doctorate among those moving from one smaller university to another.

A final contrast between large and small universities in the academic market is seen in the sources of job information and hiring channels. The young economists who obtained instructor and assistant professor positions in the largest graduate departments and the well-established economists who moved from one large department to another learned of these jobs without a direct personal application and without recourse to formal channels of job information. They obtained their new positions through the familiar procedures of informal contacts between department chairmen, professors, and friends. Although informal procedures were also predominant among economists obtaining initial positions in smaller institutions and among those moving between smaller schools, a relatively large proportion of these (almost one-third of the young economists and 18 per cent of the established economists) first learned of the job through letters that they, themselves, had sent out or through such formal channels as placement bureaus, advertisements, etc.

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[8] A special analysis of 202 interacademic moves made by 127 economists was derived from previously unutilized data gathered by V. Anantaraman in the 1960 survey of economists. I am indebted to my assistant, John Parker, for aid in tabulating these data.

[9] Calculated from unpublished data provided by Professor Howard Marshall.

These findings are confirmed by Professor Marshall's survey of economics departments. Asked to indicate the means by which their last faculty placement had been selected, the respondents, as a whole, favored informal over formal procedures, but there was a notable variation by size of department in the use of such formal channels as university vocational bureaus, private employment agencies, the U. S. Employment Service and *American Economic Review* advertisements, and in the extent to which the employee was recruited through a letter which he sent to the department. These formal and employee-initiated methods were used by 45 per cent of the smallest departments (one and two members), 33 per cent of the medium-sized departments (five to eight members), and only 18 per cent of the largest departments (nine or more members).[10]

In appraising the structure of the academic market for economists, we need not go as far as Theodore Caplow who finds, in the *Academic Marketplace,* that the initial choice of a poor graduate school or a very low first job leaves an indelible mark which the faculty member cannot usually overcome.[11] We have seen that a Ph.D. from one of the largest graduate schools can serve as a vehicle for movement from an early position in small schools to eventual jobs in large ones. There is substantial movement between universities of varying size. Nonetheless, there are also characteristic patterns of mobility within size categories which help to define substructures in the academic market. These result in part from variations in the motives and interests of economists in response to differences in working conditions and prestige of institutions; but they also result in part from a difference in control over the source of supply and an element of exclusiveness in access to sources of job-related information in the largest economics departments.

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[10] *Ibid.*

[11] Theodore Caplow, *The Academic Marketplace* (New York, 1958), p. 225.

How Adequate Are the Market Mechanisms?

In appraising the adequacy of the market mechanism, we would first want to know the extent of job mobility among economists. One useful approach may be through a comparison with other employees. The 280 established economists (average age 47 years) surveyed in 1960 had worked for an average of 3.5 employers from the time of their first full-time professional job until the time of the survey. Ten per cent had made no job shifts and an additional 20 per cent had shifted only once. On average, they had spent 7.7 years per job.[12]

Although comparisons with other groups are fraught with all of the usual pitfalls of differences in time periods, sampling techniques, concepts, and methodology, an effort has been made to reconcile these differences and arrive at some imperfect comparative estimates. Those interested in the details are referred to the larger study. In summary, the economists appear to be less mobile than manual workers studied by Reynolds and Palmer and the scientists studied by the Bureau of Labor Statistics but somewhat more mobile than professional employees generally, as indicated in Palmer's six-city survey.[13] Economists in this sample also seem to be somewhat more mobile than the social secientists studied by Lazarsfeld and Thielens.[14]

Job mobility among economists apears to have made a substantial contribution to the forces of supply and demand; and, as interinstitutional raiding increases with a further tightening of the market, the impact of mobility is likely to become even greater. One indication of its importance for supply is found in the sources of new faculty additions in the economics departments surveyed by Professor Marshall. Of 712 new faculty members added in the past three years, over half came from other positions in teaching, government, and business rather than directly from graduate training.[15] And a departing economist will usually give rise to a demand for his replacement.

A further factor in the relationship of mobility to supply deserves mention. It is a mistake to think of new Ph.D.'s as net additions to the supply of economists. Many new Ph.D.'s obtained their degree only after holding a full-time teaching position elsewhere. In our survey of established economists, 46 per cent were in this category. The National Education Association found a similar proportion of new Ph.D.'s in the 1958-60 period who had had previous teaching occupations.[16]

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[12] Anantaraman dissertation, pp. 42, 43, 178.

[13] *Ibid.*, pp. 41-47. Lloyd Reynolds, *The Structure of Labor Markets* (New Haven, 1951). Gladys Palmer, *Labor Mobility in Six Cities* (New York, 1954). BLS Bulletin, No. 1169, *op. cit.*

[14] Paul W. Lazarsfeld and Wagner Thielens, *The Academic Mind* (Glencoe, Illinois, 1958), p. 439.

[15] *Op. cit.*, Table 21

Granted that there is considerable job mobility among economists and that this has a substantial impact on the forces of supply and demand, it still remains to be asked whether this job movement is "good" or "bad" from the standpoint of the efficient allocation of resources. This question, in turn, is related to the adequacy of sources of information about jobs and applicants and the "rationality" of economists in their job movement.

Although hiring institutions may deplore the "waste" of excess mobility, well-established economists feel overwhelmingly that their job mobility was "rational." Sixty-five per cent of the respondents feel that their job movement constituted a strong rise in their professional standing, and an additional 29 per cent feel that it constituted somewhat of a rise.[17] Since Lazarsfeld and Thielens have found that mobility is greatest among the most productive social scientists, it is possible that their relocation to more congenial institutions also furthers over-all productive efficiency.[18]

Opinions are more divided on the adequacy of present sources of job information. A third of the respondents feel that market information in the academic sphere is inadequate.[19] Those who have a shorter period of experience in the profession are somewhat more convinced of the inadequacy of information, however, and this finding is supported by the survey of young economists. Among the new instructors and assistant professors, almost half feel that the sources of job information are inadequate.

Suggestions for Improvement

Those who want improvements in the market mechanism almost invariably stress the desirability of greater organization and public dissemination of sources of information on jobs and applicants. This need was stressed by the economists responding to our surveys and is advocated by many hiring institutions. Since there are already some elements of organization in the sources of market information, a fruitful approach would be through extension and increased utilization of the most promising of these existing agencies. The most promising would appear to be the current arrangement arrived at in recent years by the largest graduate departments for the exchange of information on candidates, job openings, and salary schedules.

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[16] National Education Association, *Teacher Supply and Demand in Universities, Colleges and Junior Colleges, 1959-60, 1960-61*, Research Report 1961-R12.

[17] Anantaraman dissertation, p. 134.

[18] *Op. cit.*, p. 9.

[19] Anantaraman dissertation, p. 98.

This arrangement is the most promising because it is the only organized apparatus which carries with it sufficient prestige to be widely utilized by major universities and job candidates interested in these universities. Other organized channels such as the U. S. Employment Service, vocational placement bureaus, and *American Economic Review* advertisements are used very little, except by the smaller academic institutions, some companies, and government departments. Most candidates fall back on these agencies only as a last resort. Although critics of the present market arrangements stress the need for more highly organized employment agencies, our surveys disclosed that the most dissatisfied are those who were forced to use these agencies in finding a job.

Of two additional organized agencies in the economists' labor market, U. S. Civil Service announcements will continue to play an important role for those interested in the government sector. The other, the so-called "slave markets" at American Economic Association and regional association meetings, appear, on the basis of our surveys, to be useful in furthering an already-initiated job contact rather than as a source of primary information on jobs and applicants.

If the current exchange arrangement between the largest graduate departments is to become the basis for a general center of market information, some means must be found to generalize it. One approach would be through an extension of the reciprocal trade agreements to an ever widening circle of universities. Some movement in this direction is already apparent with the recent admission of some smaller graduate departments into the cartel. Another approach would be through a liaison between the major graduate departments and the U. S. Employment Service. For the past several years the USES has maintained a roster of jobs and applicants at the AEA meetings. Although the agency has met with some limited success in obtaining applications for employment, orders from employers have been sparse. Analysis of applications, orders, interviews, and referrals for 1953 and the past four years reveals no trend toward the greater acceptance of the Employment Service (Table 1). In 1960, only 338 applications were received and only 215 orders placed. In the surveys of economists and economics departments, placements through the USES were found to be of almost no significance in the total market picture.

It is apparent that the USES roster presently lacks the prestige required for general acceptance by the economics profession. It is for this reason that a liaison between the Service and the major graduate de-

TABLE 1

APPLICATIONS, ORDERS, INTERVIEWS, AND REFERRALS, U. S. EMPLOYMENT SERVICE ROSTER AT ALLIED SOCIAL SCIENCE ASSOCIATION MEETINGS, 1953, 1957–60

APPLICATIONS, INTERVIEWS, AND REFERRALS*

Year	Total Applications	Pre-conference Applications	Activated at Conference	Applications Received at Conference	Interviews	Referrals
1953	621	480	300	141	600	1,007
1957	421	63	403	358	548	1,860
1958	415	†	†	†	†	1,805
1959	516	236	†	280	862	†
1960	338	146	123	192	†	†

ORDERS FROM EMPLOYERS

Year	Total Orders	Received Pre-conference	Activated at Conference	Received at Conference
1953	122	36	†	83
1957	158	29	†	129
1958	232	†	†	†
1959	241	68	59	173
1960	215	101	83	114

* Application data for 1959 are for AEA members only. For other years, the data refer to members of the Allied Social Science Associations.

† Data not available.

SOURCE: Calculated from data provided by the Bureau of Employment Security, U. S. Department of Labor.

partments would be essential for its wider utilization. To be successful, any public employment exchange for economists must develop under the principal aegis of the universities which provide the major crop of job applicants and the most sought-after job openings.

DISCUSSION

SEYMOUR E. HARRIS: I have very little to criticize in the three excellent papers by Messrs. Clague, Boddy, and Somers. Dr. Clague estimates the number of economists at twenty thousand but I am glad to note he said that twenty thousand were employed as economists, because many of these would probably not qualify as economists because of lack of training. He notes the large attrition of economists among the A.B. group. This is to be expected. I am not sure that the study on which Clague partly bases his conclusion, namely, that done for the National Science Foundation, is especially appropriate because their sample includes only 10 per cent women, which is a rather small representation of women in comparison with the national figures.

That a large proportion of these economists are not well trained is suggested by the fact that there were roughly about 5,500 Ph.D.'s in the group by 1960. These figures are based on Dael Wolfle statistics for 1954, here brought up to date; but there will be a large demand for economists and especially in the academic area, as suggested by the fact that the National Educational Association estimates full-time economists in 1960 at 6,250, and a need of 8,500 in the sixties to replace those that leave or die and to provide for increased enrollment.

I am not exactly satisfied that counting the numbers is adequate, for problems of productivity are relevant. There is no doubt that by reducing the number of small classes, alternating courses, and making students do more independent work we can greatly increase the productivity of a given number of academic economists. It is of some interest that the National Education Association estimates that the proportion of students to teachers will increase from 13.25 in 1960, to 15.75 in 1970.

As I said above, merely counting noses is not enough. What we are especially interested in is the quality of the students who go into economics and especially into teaching. In a study of aptitude of the veterans of World War II, economists emerged in the middle of the academic group. In a study that I once made, when Chairman of the Economics Department at Harvard, of the high *magnas* and *summas* since the early twenties, I discovered a surprisingly small proportion going into economics. Yet we have been able to save a large number of our Harvard *summas*, for example, for the economics profession. Just to mention some of these: Hart at Columbia, Abramovitz at Stanford, William Salant (Brookings and now of CED), Heilbroner (free lance), Solow, Bishop, Alexander, and Fisher (all four at MIT), Tobin at Yale, Quandt at Princeton, Ellsberg at RAND, Margolin, Hufbauer, Deitch—the last three still doing graduate work and likely to attract attention in the next generation.

We should note one aspect of the demand for economists. Since the late twenties the field of economics has lost about 40 per cent relatively in the proportion of undergraduate concentration, a fact that may be explained by prosperous economic conditions or by a tendency, as parents became more educated, to encourage their children to study the humanities rather than what they conceive to be a vocational field, economics.

I am glad to note that the cartel of chairmen of economics departments (when I started this organization a number of years ago it was facetiously known as the "Harris Cartel") still operates as a mechanism in part for improving the market for economists. I am pleased to see that the numbers have increased from about 12 to 27 chairmen.

Professor Boddy notes that many less economists seem to go into government now than in the thirties. Undoubtedly the explanation is, in part, the attitude toward economists in the Eisenhower Administration and, currently, undoubtedly the excellent prospects in the academic world. But I note in 1961 a tendency for more economists to join the Administration—more eager, no doubt, to join an Administration that supports analysis of economic problems.

Boddy has presented some excellent work over the years on the pay in some of the leading universities. He makes it clear that the yearly rise has been about 5 per cent, which means that it will require more than fourteen years for salaries of the academic economist to double. Indeed there is much to be said for doubling of the academic pay. Harvard, for instance, with the highest pay for full professors in the country, just a few years ago paid full professors 20 per cent less than in 1930 with adjustments for changes in the price level. Currently the full professors' pay in the nation is roughly equal to the 1930 level. (Here I allow for the reduction in average age of professors.) There has been a tendency for the range between full professors and instructors to narrow, a usual development in periods of economic stress. When one compares Boddy's salary figures with the national more comprehensive figures, published by HEW, it is clear that the larger schools have been losing ground relative to others, this despite the fact that smaller colleges complain of increasing inability to compete for first-class personnel.

But we should not assume that a 100 per cent increase is necessary. A 100 per cent rise by 1970 would bring the professors' pay up to that of the working population with a 1930 base. (This allows for a 30 per cent rise for the average worker in the sixties.) It may well be that faculty pay was a little high in 1930. It is also well to remember that the average college faculty member in the next ten years is going to be younger, will have somewhat less training than the current faculty, has experienced relatively large rises in fringe benefits, and has increased outside earnings.

The first guide of the rise of faculty salaries should be that necessary to recruit a staff of quality. That means a substantial absolute and relative rise for a group which is likely to grow three times as much as the whole labor market in the sixties. But we must not exaggerate the importance of monetary incentives. Working conditions and prestige are also important. I can add very little to Professor Somers' excellent discussion of the organization of the market for economists, so deficiently set up. The market is splintered even to a greater extent than Mr. Somers had indicated. For example, there is a special market of satellite colleges that are tied to Harvard, another to California, and still others to Chicago, Minnesota, and to other great universities. The same colleges tend to apply to the same universities for their men, though in a tight market they may begin to shop elsewhere.

Many more economists now obtain positions by direct application. Why not—although when I was a graduate student this was considered unethical. I also see no reason why economists should not have greater recourse to advertising. Indeed this may mean more work for the chairman, and many letters by incompetents and even cranks will be received, but this is one way of making openings known and would-be candidates also.

One final word. Professor Somers has said a good deal about mobility. It should be noted, however, that tenure is a factor that works against mobility. I believe that currently tenure is often granted too easily. I estimate that an appointment of a professor in a modern great university at age thirty to thirty-five means a commitment of about a million dollars (I assume modest inflation), and one may raise the question whether these commitments should be made without the greatest care, say at the early age of thirty. When the famous Harvard Report of the Committee of Eight was made, in the late thirties, it was assumed that tenure would come at the ages between thirty-five and forty. But actually these days it is more likely to come at ages thirty to thirty-five, and often first-class people for tenure appointments aged thirty have been considered.

HOWARD D. MARSHALL: Each of the preceding papers has suggested that there are many different aspects to the labor market for economists. Even if one considers only the demand side of the market, the problems experienced by different employers are quite dissimilar. The difficulties of recruitment and placement of the small college differ from those of the large university, while employers in the academic world face a different situation from those in business and government.

Although I have been asked to concentrate my comments on Professor Somers' paper, I would like to make one general observation about Dean Boddy's statistics on salary increases. It seems likely that these somewhat understate the magnitude of the increase since, particularly at the lower ranks, they do not allow for the upgrading of persons in rank. There was evidence in my survey, for example, that many more schools make appointments at the assistant professor rather than the instructor rank and that the old requirement of the Ph.D. before appointment to any rank above instructor has been dented if not broken.

I find myself somewhat uncomfortable in the role of critic of Professor Somers' paper since, as he generously acknowledged, part of his evidence comes from a survey made by me and I have have no desire to quarrel with my own figures and because I find myself in basic agreement with many of his conclusions.

I have decided, therefore, to elaborate upon some of the findings of my study and to indicate some minor points of disagreement with Professor Somers' interpretations. In light of Dean Boddy's characterization of the product "economist," I should add that I have defined academic economist as any one teaching at an institution that offers a major in economics with junior and teacher training colleges excluded. The following figures are taken from the 349 usable responses.

The amount of placement taking place each year is considerable. A total of 435 shifts had occurred within the past three years. While one-third of the departments reported no turnover, 48 departments reported losing three or more members. In addition there were 235 appointments necessitated by expansions in the size of departments.

As professor Somers indicated, the bulk of the shifts were to other teaching positions but a sizable number also moved into business and government. I suspect Professor Somers is probably right in explaining the number of shifts to business and government (as compared to other surveys) as a function of the possession of the Ph.D. although I am less certain in the case of business, where opportunities increase annually. In any case it might be well to add that the return flow to academic life is even more closely balancing than he suggests. Thus while 59 went to business, there were 60 returnees and for government the 38 leaving were offset by the 30 returning.

Chairmen reported that the market had grown increasingly "tight." About 25 per cent reported having had one or more unfilled vacancies within the past three years. While I do not want to appear unduly modest, it does seem to be clutching at a very weak straw indeed to ask my aid in locating an economist. Yet a number of schools have done so, including two that were not even in my sample. Some of the difficulties exemplified by these schools may undoubtedly have been a function of salary, but I have the impression that even schools with comparatively good salary scales have problems locating economists to teach particular fields or at the upper ranks or both.

Despite the number of replacements and new appointments indicated above, the methods of recruitment and placement remain somewhat haphazard and informal. When chairmen were asked how their last placement was made, the following answers were received. Of 322 placements: 2 per cent were made through *American Economic Review* advertisement; 4 per cent were made by the USES; 4 per cent were made by private employment bureaus; 5 per cent were made by informal contacts at the annual meetings; 8 per cent were made through university vocational bureaus; 18 per cent were made by word of mouth, this including contacts with friends in other departments and at regional meetings; 20 per cent were made from letters of application; and 22 per cent were made by request to the chairman of graduate departments. The remaining 17 per cent were made by a miscellaneous variety of means, such as "own graduates," *AAUP Bulletin*, and personal knowledge or published writings.

Although the above statistics indicate a heavy reliance upon the less formal methods of placement, they also suggest that Professor Somers overstates the case when he says "almost all jobs are obtained through informal contacts. . . ." Fifty-seven of the 322 placements, or about 1 out of 6, were made through the USES, a private or university placement bureau, or by advertisement in the *American Economic Review*. I doubt if any of these four would be categorized as "informal" by Professor Somers and I question whether letters from applicants and requests to chairmen should be so designated either.

Professor Somers' suggestion that the techniques of recruitment by small schools differ from those for large schools is borne out in part when one examines the frequency with which various techniques are employed. Thus no department of seven men or more regularly used the ads in the *AER* while 10 and 21 per cent, respectively, of the one- and two-man departments did so. The frequency of reliance upon private employment bureaus and the USES showed much the same contrast. An exception, however, was that both large and small departments relied almost equally heavily upon letters from applicants and requests to the chairmen of graduate departments. What was striking to me was the extent to which both large and small schools relied upon these last two methods and the relatively small use both made of the four channels listed earlier.

I would like to conclude by asking several questions which I think none of the papers this afternoon have really answered. Why are the USES and the *AER* ads so little used? Is it because both buyers and sellers feel only the dregs are listed here or are there problems in utilization which, if corrected, would make both more useful? Some might interpret the above statistics as signaling the advisability of terminating both services. Would it not be far better to attempt to improve the usefulness of these services, particularly in view of the increasing numbers of economists and placement projected for the future? Is the monopoly of economists by leading graduate schools described by Professor Somers a crucial problem? Or is this a situation which to some extent has always existed with the real pressure for small- and medium-size private schools coming from the competition of state supported schools expanding to meet the growing college population? Finally aren't the preceding papers being a trifle too casual about the ease with which the expanding demands for education in economics can be met and too indifferent to the malfunctioning of our own market? My own feeling is that while there is no "groundswell of outrage," there is considerable dissatisfaction with the manner in which it now functions.

GEORGE CLINE SMITH: In the points they make, these papers have all been excellent. But like most economists, our speakers have totally ignored an increasingly important aspect of the market for economists: the practice of economics. As a matter of fact, they can hardly be blamed for their omission, because even the concept of practice is strange to our profession. I suspect that this is merely because we are an immature profession, not in any opprobrious sense, but simply by contrast to such older professions as law, medicine, or accounting.

It is customary to divide our profession up largely on the basis of employers. Customarily, our market is considered to consist of government, academic, and "other" branches. There is little understanding of the functional division of the profession—possibly because we have only recently even come to think of our work as a profession.

Despite the obvious shortcomings of analogies, I think one can usefully take an analogy with the medical profession as a starting point in this discussion. In medicine, there is a clear functional division of the profession into the three fields of research, teaching, and practice. The functions are quite distinct, although it is true that there is some overlap in function on the part of individuals; researchers may teach, and vice versa; and practitioners also may teach, although they do relatively little research.

It is time we realized that the profession of economics contains the same three functions: research, teaching, and practice. The most significant distinction between the two professions is that the proportion of practitioners in medicine is very large, while in economics it is so small as to be ignored until recently.

What is the practice of economics? To stick to our analogy, it consists of diagnosis and prescription. In economic terms, it consists of analysis of trends, study of relationships (syndromes), prognosis, and advice. To perform these functions, it is not necessary that a practitioner do research (in the basic sense) or that he teach, although experience in both fields may well make him a better practitioner.

We can take the usual employment classification of economists and cross classify it by functions. As a first approximation, it would look something like this:

Function	*Principal Employer*
Teaching	Academic
Research	Academic, government, private research foundations, and to a smaller extent, firms, unions, trade associations
Practice	Academic (consultants), business firms, consulting firms, unions, trade associations, and government

This list, of course, could be much refined, if we try to account for all the overlaps, such as part-time teaching by practitioners. But it serves as a rough guide.

I have two rather strong feelings about this subject: first, that the practice of economics is rapidly growing in importance; and, second, that virtually nothing is being done to train practitioners for this function.

One evidence is the strong feeling on the part of practitioners in business which led to the formation and speedy growth of the National Association of Business Economists. And at this point, as one of the organizers and a past president of NABE, let me deviate long enough to reassure members of the American Economic Association that this new organization is neither a splinter group nor a competitor.

It was the feeling of the organizers of NABE that the practice of business economics had reached the stage where mutual discussion of professional matters was well worth while, and that no existing organization provided such a forum. We would have been happy to organize under the umbrella of AEA, but this proposal proved contrary to AEA's policy of non-compartmentation.

As a noncompetitive group, we deal with special problems not treated by the broader economic and statistical organizations. The great majority of the NABE members are also loyal members of AEA, ASA, and other broad-interest groups.

As an official of NABE and as an employer of practicing economists, I can testify that growing demand for practitioners, coupled with short supply, has produced a sellers' market. There are positions available at good salaries for qualified practitioners which have remained unfilled for months or even years.

There is a catch here, of course: the word "qualified." A good practitioner must be a good economist—well trained and competent to judge and advise. Many economists meet this requirement. But in the practice of economics there is a crying need to communicate by the written and spoken word, and there economists in general seem to be woefully weak. The practitioner is a middleman, standing between the teacher-researcher-statistician group on the one hand, and the layman who must make and implement decisions based on economic factors. A prime function of the practitioner is to translate "economese" into English. This, let me emphasize, in no jibe at the existence of a specialized economic jargon—all professions necessarily have something of the sort.

I am, however, inclined to be critical of our failure to recognize and meet the growing need for practitioners. As one respected economist has remarked, the primary function of economists apparently has been to train economists to train more economists. Only accidentally does a good practitioner emerge from the chain.

The academic economist bears the principal responsibility for remedying the situation. First, he must recognize that there is a practice of economics, and then he must determine how best to train students for this practice. The solution will undoubtedly involve some penetration down into the undergraduate level, in the selection of likely candidates for practice, and in giving them prepractice training in writing and speaking, among other things.

The profession of economics has grown enormously in stature in the past three decades. Anyone who doubts this may be reassured by reading the vicious attack on economists in Philip Wylie's *A Generation of Vipers*—an attack which makes one rather proud to be an economist, if one reads between the lines.

We are still a young profession, however. Time will bring maturity. I am simply hopeful that we can speed up the process by recognizing and improving the practice of economics, starting now. There is more than a little self-interest involved for economists. Since the practitioner, more and more, serves as the contact between the profession and the public, providing an adequate supply of good practitioners is the best sort of professional public relations.

AMERICAN ECONOMIC ASSOCIATION

PROCEEDINGS
OF THE
SEVENTY-FOURTH
ANNUAL
MEETING

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NEW YORK, NEW YORK
DECEMBER 27-29, 1961

PROCEEDINGS OF THE AMERICAN ECONOMIC ASSOCIATION

ANNUAL BUSINESS MEETING, DECEMBER 29, 1961
HOTEL COMMODORE, NEW YORK, NEW YORK

The Seventy-fourth Annual Business Meeting of the American Economic Association was called to order in the Windsor Ballroom of Hotel Commodore at 5:00 p.m. by President P. A. Samuelson. The President reviewed the order of items on the agenda, which had been distributed before the meeting. The first item of business was to call for the approval of the minutes of the meeting of December 30, 1960, and the ratification of all actions of the Executive Committee and the acceptance of reports of the officers and committees of the Association which are recorded in the "Proceedings."

The reports of the Secretary, Treasurer, the Finance Committee, and the Auditor were presented by J. W. Bell. Copies of financial statements, investment holdings, and the Auditor's Report were made available for inspection. Plans for annual meetings through 1964 and for 1965, 1966, and 1967 were outlined and the major activities of the Secretary's Office were described. The details of membership growth and problems of billing and mailing and other aspects of office management may be found in the reports referred to.

The financial condition of the Association is gratifyingly sound. Instead of an anticipated deficit, we have a year-end surplus; but some of the activities which we had planned did not materialize and these are discussed in the reports published below.

The Treasurer described the work of the Finance Committee and took occasion to repeat his commendation of the effective manner in which his colleagues, C. W. Farnham and C. D. Anderson, have managed the portfolio to take advantage of favorable market conditions, so that we have again been able to take substantial profits on sale of stocks, despite which the market value of our holdings has increased. The Treasurer called attention to the contents of the Auditor's Report, especially to Exhibit 3, which treats separately the foundation grants made for special Association projects, and to the demurrer relating to the auditor's responsibility made necessary by our incomplete records but reflecting the care with which the firm of David Himmelblau and Company prepares its reports.

The above reports were accepted, with a vote of thanks to the members of the Finance Committee and to the Auditor.

The Report of the Managing Editor, published below, was summarized by B. F. Haley, who described the activities of the Editorial Office and expressed his appreciation for the effective work done by members of the Editorial Board and by the consultants, listed in the report, who proved to be so helpful in the work of the *American Economic Review*. Copies of the Editor's report were distributed for inspection.

Reports of the Committees on Research and Publications, Economic Education, and perhaps other committees that had been especially active during the year were contemplated, but time permitted only mention of the report of the W. Allen Wallis' Committee on Group Insurance. The officers of the Association feel that the members should know that we have given serious attention to this subject but have taken no positive action, since evidence is lacking that any substantial number of our members would be interested. Attention was also called to the publication of a sample issue of the *Journal of Economic Abstracts*, edited by Arthur Smithies. Copies were exhibited at the meeting.

It did not prove feasible to listen to reports of our representatives to the ACLS, SSRC, NBER, and AAAS, but these are published below.

Reports of officers, committees, and representatives are published in the "Proceedings" as follows:

Report of the Secretary (page 536)
Report of the Treasurer (page 553)
Report of the Finance Committee (page 558)
Report of the Auditor (page 563)
Report of the Managing Editor (page 569)
Reports of the Committees on:
  Research and Publications (page 573)
  Cumulative Index Project (page 574)
  Economic Education (page 575)
  National Task Force on Economic Education (page 576)
  Papers and Proceedings (page 577)
  Census Advisory Committee (page 589)
Reports of Representatives:
  ACLS (page 590)
  SSRC (page 592)
  NBER (page 595)
  AAAS (page 596)
  IIE (page 597)

The death of Frederick Shipp Deibler, Secretary-Treasurer 1925-35, had just been reported, and it was announced that an appropriate memorial would be drafted for publication in the *Papers and Proceedings*. It was suggested that the resolution contain also a memorial to Ray B. Westerfield, Secretary-Treasurer 1921-25, whose death occurred in August.

Report of the Committee on Elections. The report of the Committee on Elections and the certification of the election of new officers for the year 1962 were presented by the Secretary, as follows:

> In accordance with the bylaws on election procedure, I hereby certify the results of the recent balloting and present the reports of the Nominating Committee and the Committee on Elections.
>
> The Nominating Committee, consisting of Arthur F. Burns, Chairman, William C. Hood, James W. McKie, Arthur M. Okun, Daniel C. Vandermeulen, and Janet L. Weston, presented to the Secretary the list of nominees for the respective offices:

For President-elect
Gottfried Haberler

For Vice-Presidents	*For Executive Committee*
Joe S. Bain	Vincent W. Bladen
Albert G. Hart	Herbert Stein
Richard A. Musgrave	Robert Triffin
Lawrence H. Seltzer	W. Allen Wallis

The Committee on Elections, consisting of Rolf A. Weil, Chairman, Robert H. Strotz, and James Washington Bell, prepared biographical sketches of the candidates and ballots were distributed early in November. The canvass of ballots was made on December 13, 1961, and the results were filed with the Secretary.

From the report of the Committee on Elections, I have the following information:

Number of envelopes without names for identification	27
Number received too late	13
Number of defective ballots	1
Number of legal ballots	3,805
Number of returns from the mail ballot	3,846

On the basis of the canvass of the votes cast, I certify that the following persons have been duly elected to the respective offices:

President-elect (for a term of one year)
Gottfried Haberler

Vice-Presidents (for a term of one year)
Albert G. Hart
Richard A. Musgrave

Members of the Executive Committee (for a term of three years)
Robert Triffin
W. Allen Wallis

Immediately after the reading of this report, Professor Arthur F. Burns asked for the privilege of the floor to present a silver tray as a tribute to retiring Secretary James Washington Bell, who in his response expressed appreciation of Professor Burns's remarks and gratification for the privilege of serving with distinguished economists over a long succession of years, the pleasure of working with an efficient staff in our headquarters office, and for the loyal and liberal co-operation of the members of the Association. He bespoke his hope that his able successor would receive the same co-operation and support.

The new officers were then inducted, and President E. S. Mason took the chair and called for any unfinished business. There being no unfinished or new business to come before this meeting, the report of the Committee on Resolutions was called for and read by Walter Adams:

Be it resolved that this Association express it appreciation to all those who have participated in the planning, organization, and administration of its Seventy-fourth Annual Meeting. The Association is especially grateful to its President, Paul A. Samuelson, for his timely and challenging address; to its President-elect, Edward S. Mason, for designing a program of unusual appeal to the membership; to the Executive Committee for assisting in the difficult task of program planning and implementation; to the many speakers and discussants who have contributed to our edification and enlightenment; to Robert Lindsay, the efficient, patient, and diplomatic Chairman of the Committee on

Local Arrangements, and his associates on this Committee, Paul Volcker, Frederick Schadrack, Henry Kaufman, Arnold Sametz, Robert Parks, James Riley, Robert A. Kavesh, Lawrence Ritter, and Marian E. Moran, and all the young men and women from the Federal Reserve Bank of New York who have worked so assiduously to make our stay here comfortable and satisfying; and above all, our outgoing Secretary-Treasurer, James Washington Bell, whose many years of dedicated service have earned him the profound appreciation, admiration, and affection of his colleagues in this Association.

WALTER ADAMS, *Chairman*
JAMES W. MCKIE
WYN OWEN

The meeting was adjourned at 6:00 p.m.

JAMES WASHINGTON BELL, *Secretary*

THE JOHN BATES CLARK AWARD

CITATION BY CLAIR WILCOX, CHAIRMAN, COMMITTEE ON HONORS AND AWARDS, ON THE OCCASION OF CONFERRING THE MEDAL ON ROBERT M. SOLOW

Every other year the American Economic Association awards the John Bates Clark Medal "to that economist under the age of forty who is adjudged to have made a significant contribution to economic thought and knowledge." In past years, the Association has awarded the medal to Paul A. Samuelson, to Kenneth E. Boulding, to Milton Friedman, to James Tobin, to Kenneth J. Arrow, and to Lawrence R. Klein. The award is made by a joint vote of the Association's Executive Committee and its Committee on Honors and Awards. This year, as before, the selection of a recipient for the award was difficult. The committees were forced to choose among a number of younger economists, all of whom were qualified. Its final choice was Professor Robert M. Solow of the Massachusetts Institute of Technology. In arriving at this decision, the committees were impressed by the wide range of Professor Solow's interests, by the originality and the excellence of his analytical techniques, by his substantive contributions to the theory of income distribution and to the theory of economic growth, by the emphasis he has placed, not on mathematical or statistical method, but on the economic significance of his work, and by his ability to contribute not only to the advancement of economic knowledge but also to the formulation of economic policy. On behalf of the American Economic Association, I now have the privilege and the pleasure of presenting the John Bates Clark Medal to Robert M. Solow.

IN MEMORIAM

FREDERICK SHIPP DEIBLER

1876-1961

Frederick Shipp Deibler, Professor Emeritus of Economics of Northwestern University and former Secretary-Treasurer of the American Economic Association, died, after a brief illness, in Evanston, Illinois, December 26, 1961.

A native of Indiana, Professor Deibler was educated first at Hanover College, where he received his bachelor's degree in 1900. After serving two years as a high school principal in Illinois, he began his graduate work at Harvard, where he received an A.B. degree in 1903 and an A.M. degree in 1904. Transferring to the University of Wisconsin, he completed requirements for the Ph.D. degree in 1909 (while instructing at Northwestern University).

Professor Deibler's academic career was spent at Northwestern, where he advanced from assistant and associate professor and then to full professor and department head. He served in the latter capacities from 1915 until his retirement in 1942. During the summers and after his retirement from Northwestern, he lectured as visiting professor at the University of Chicago, the University of Southern California, the University of Buffalo, and Indiana University. He published his *Principles of Economics* in 1929, with a second edition in 1936. In 1947 he received an LL.D. degree from Miami University.

Along with his teaching, Professor Deibler's talents and skills were directed to administrative work, investigation, and consultation. He became known for his work with the NRA and WLB and was in great demand as an arbiter and mediator in the shipping and boot and shoe industries and the newspaper and printing trades. He was active in the affairs of the AAUP, served a number of years as Chairman of the important Committee A, and served as President from 1940 to 1941. He also took keen interest in the activities of several professional fraternities. Of all his many interests, the one that seemed to give him greatest pleasure was his work with the American Economic Association. He became a member in 1908. In 1919-20, he served as a member of the Executive Committee and in 1925 he became Secretary-Treasurer and served faithfully and with distinction during a trying period of the Association's history, 1926-35. He was ex officio member of numerous committees during these years, and later in 1939 he served on the Nominating Committee. Professor Deibler's long and productive career stemmed from his sturdy native ability plus a generous touch of Hoosier wit. These personal characteristics enhanced his ability to make friends, engendered loyalties, and established *esprit de corps* among members of his staff. All who had occasion to associate with Fred Deibler became impressed by his solid scholarship, his integrity and sincerity, his good sense and spirit of fair play, his forthgoing desire to help others, and his ardent search for the truth. People believed what he said because he believed it himself. His teaching inspired students to think for themselves—objectively and not selfishly. His healthy influence left a mark on students and associates alike, and his colleagues are appreciative of his many contributions to the welfare of the Association.

A photograph was published as a frontispiece in the September, 1956, number of the *American Economic Review*. This is one of the series of past officers of the Association.

IN MEMORIAM

RAY BERT WESTERFIELD

1884-1961

The Executive Committee records its sense of the great loss sustained by the Association and the economic profession in the death of Ray Bert Westerfield.

A native of Ohio, Professor Westerfield received his bachelor's degree from Ohio Northern University in 1907 and M.A. in 1910 (honorary Sc.D. in 1935). After graduation, he served as a high school principal before continuing his postgraduate work at Yale in 1911. In 1912, while still a graduate student, he joined the American Economic Association. Awarded the Ph.D. degree in 1913, he began his active and productive career as instructor in political economy at Yale, where he was advanced to assistant professor in 1916, and to full professor in 1922.

During the year of 1920, he became Secretary-Treasurer of the American Economic Association and served in this capacity to 1925. His interest in Association affairs remained active. He was a member of the Nominating Committee in 1934 and again in 1938 and he served a three-year term as an elected member of the Executive Committee 1939-41. He was active as well in the American Statistical Association, the Econometric Society, and Rotary International and in professional fraternities.

His services as visiting professor and lecturer were in great demand. He taught summers at the University of California, Northwestern University, Ohio State University, and the University of Southern California and was a visiting Westinghouse professor to Italian universities.

In his research and writing, Ray Westerfield's interest began in the field of marketing and business organization but shifted to money, banking, and financial institutions, where his many publications, encyclopedic in scope, bulked large as he became a recognized authority, not only as a scholar, but also as a man of affairs. He served on numerous advisory bodies and on the research staffs of government and private agencies and he became president and director of numerous financial institutions, leagues, and associations.

Ray Westerfield's success stemmed from the development of extraordinary personal qualities—his meticulous regard for accuracy, his enthusiastic drive and boundless energy, and his friendliness and modesty. These qualities engendered confidence and loyalty and they endeared him to generations of students and associates.

A photograph of Ray B. Westerfield, one of the series of past officers, was published as a frontispiece in the *American Economic Review*, June, 1956.

REPORT OF THE SECRETARY FOR THE YEAR 1961

The Executive Committee minutes are a record of official acts of the Association. Presented below are the minutes of the March and December, 1961, meetings. Following these minutes is a summary of the year's operations, with comments and interpretations concerning the Association's activities.

MINUTES OF THE EXECUTIVE COMMITTEE MEETINGS

1. Minutes of the spring meeting held in New York City, March 24-25, 1961:

The *second meeting* of the *1961 Executive Committee* was called to order at 11:00 a.m. at Hotel Commodore, New York, New York, March 25, 1961. The following were present: P. A. Samuelson, presiding, and G. L. Bach, J. W. Bell, A. F. Burns, Ewan Clague, Solomon Fabricant, B. F. Haley, A. L. Harris, R. A. Lester, E. S. Mason, and R. A. Young. Absent were: J. K. Galbraith, C. P. Kindleberger, and T. W. Schultz. Attending as members of the Nominating Committee were: W. C. Hood, J. W. McKie, A. M. Okun, D. C. Vandermeulen, and Janet L. Weston. Attending as guests were: Roy Blough, F. H. Knight, B. W. Lewis, Clair Wilcox, and H. F. Williamson.

1. *President's Remarks* (P. A. Samuelson). After calling the meeting to order, the President outlined the items on the agenda which should receive primary attention, announced that the joint meeting of the Nominating and Executive Committees would take plaec after dinner and would be constituted as an Electoral College for the purpose of selecting the President-elect for 1962 and to discuss the slate of nominees for other offices. He reported on the status of some of the standing and special committees and announced the appointment of some members to fill vacancies.

2. *Minutes*. The minutes of the December 27 and 30, 1960, Executive Committee meetings as submitted in page proof were reviewed and approved as corrected.

The Secretary called attention to the several changes in the bylaws of the Association made necessary in order to put into effect the change in title of "first Vice-President" to "President-elect" (see December, 1960, minutes of the Executive Committee, item 9c, and of the Business Meeting, December 30, 1960).

3. *Report of the Secretary* (J. W. Bell). Although the final report of the St. Louis meeting was not at hand, the figures for attendance, financial results, and some other arrangements matters were reported, especially those items which would be of use to the Chairman of the New York Committee on Local Arrangements. The Secretary reported that Chairman Robert Lindsay was making progress in constituting the local committee, conferring with the hotel and convention people on flat rates for members, etc.

The Secretary reported that he had been definitely informed that Hotel America would not be completed in time for use at the Boston meetings in 1963. It was VOTED not to change our commitment but, if we could, shift headquarters arrangements to the Statler (see item 9 concerning meeting places for 1965, 1966, and 1967).

A brief report was made on the growth and composition of members and subscribers and the Secretary commented on the results of the "Help Save Billing Costs" campaign. A number of complaints have been received on the score that our reminders are too harsh and peremptory, but on balance the effects are proving to be salutary.

Printing and production costs of the *American Economic Review* and the *Papers and Proceedings* were reviewed. New estimates have been obtained from printers and lithographers interested in publishing the *Review* and the *Papers and Proceedings* and/or the handbook or directory. A proposal that the entire production and distribution of the revised edition of the *Handbook* be farmed out to an agency specializing in this service was considered but no action was taken, pending further investigation of costs (roughly estimated at $50,000) and the possibility of obtaining financial help from users and from foundations. It was reported that a subsidy might be available if the volume contained not only the names of members (and subscribers) but all available economists in the land.

Copies of the 1961 Information Booklet were distributed. Attention was again called to the desirability of having a career outlook leaflet produced for use in connection with the increasing volume of correspondence relating to professional guidance.

An analysis of permissions to reprint was submitted. In this analysis requests are classified according to: parties making the requests; the source (*AER* or *Papers and Proceedings*); purpose (to quote, paraphrase, reprint, or translate); use (for classroom or noncommercial use or for textbook, selected readings or essays, and so forth).

Our policy with respect to advertising was reviewed. The list of advertisers has not been enlarged since increased rates became effective. Publishers continue to be the chief advertisers in our publications. The use of our mailing list for direct advertising purposes, though a burden on the office force, has become an increasing source of revenue. A list of permissions granted and the materials sent is found appended to the Secretary's Report.

No report more recent than Christmas has been received from Richard D. Irwin, Inc., on the status of sales, inventory, profit and loss from the "Readings," "Survey," and "Translation" publications.

A follow-up circular on the five-volume cumulative index has recently been mailed by Richard D. Irwin, Inc., to all members of the Association, reminding them of their last chance to take advantage of the prepublication price.

4. *Reports of the Treasurer and of the Finance Committee* (J. W. Bell). The statements of the financial condition and the income reports were reviewed and the operating results and the budget estimates for 1961 were discussed. The current outlook is still that of a balanced operating budget (before any appropriations). If, however, the preparation of a new directory is begun this year, a deficit will be unavoidable.

The Treasurer reported changes made in the list of our securities since the December meetings and circulated an analysis showing cost and current market prices.

5. *Report of the Managing Editor* (B. F. Haley). No new developments since December, but in discussing the *Review,* attention was called to the third economic survey article financed by the Rockefeller grant, which appeared in the March number. A panel of names from which replacements on the Editorial Board are to be made at the December meeting was submitted and approved.

6. *Reports of Standing and Special Committees.*

6*a*) *Committee on Research and Publications* (Gardner Ackley). A report was read, reviewing the status of the "Readings" series and proposing the publication of a new volume on *Readings in Welfare Economics,* Professors Kenneth Arrow and Tibor Scitovsky joint editors. The term "welfare economics" is to be broadly defined. A new title is being sought. No further progress was reported on Jaffe's life and work of Walras, nor on the translation of foreign classics project. It was VOTED to accept the report and authorize the Committee to proceed as planned.

6*b*) *Committee on Economic Abstracts and Data Repositories* (R. A. Gordon). An application for Ford Foundation funds has been made ($7,000) which would enable the test run on the economic abstracts project to be carried out this summer. If the experiment proves successful, there are prospects of a five-year grant, after which the AEA would be expected to carry on the publication of *Economic Abstracts* as a regular function. Nothing was reported on the data repositories project.

6*c*) *Committee on Economic Education* (B. W. Lewis). On the recommendation of the Chairman, it was VOTED to approve the reappointment of E. T. Weiler for another term (1963) and of E. O. Edwards (1963) to succeed P. J. Strayer.

It was VOTED to approve the publication of the final report of the Committee on Economic Education dealing with the textbook project, directed by P. R. Olson, subject to final editing by B. W. Lewis and as approved by P. A. Samuelson. The purpose of the editing is to condense and make changes in the report, keeping its vigorous tone but adapting the style to appeal to teachers, members of school boards, and others especially interested. Consideration is being given to the preparation of a preface or introduction by another writer.

Two years ago it was recommended that a joint study of the status of the social sciences in the secondary schools be made by the ACLS, SSRC, NCE, and JCEE. In its present form, the ACLS is directing a task force in producing a substantial study consisting of papers in each discipline.

6*d*) *National Task Force on Economic Education and Continental Classroom* (G. L. Bach). Two items were reported:

(1) The report of the Task Force, now in rough draft, will be completed by deadline date, June 1, 1961. The finished report will be a pamphlet of about a hundred pages, the content dealing with what is important and teachable, and will be distributed to economists and educators interested in economic education on the secondary school level.

(2) On the recommendation of G. L. Bach, it was VOTED to approve the nomination of a panel from which the Joint Council on Economic Education could appoint a public advisory committee for its guidance in the preparation of educational materials for sec-

ondary schools. It was explained that this committee would be a body not responsible to the AEA but to the profession. (Approval of this matter was not unanimous.)

6e) *Committee on the Papers and Proceedings* (Roy Blough). On behalf of the Committee, Mr. Blough submitted a preliminary report with appendices containing results of a sample of members who had responded to an extensive questionnaire on the *Papers and Proceedings*. Of this sample, virtually all wanted to maintain the *Papers and Proceedings* as now produced and expressed a willingness to pay extra for the volume if necessary, this on the assumption that the program would continue to be more or less as it now is. Although its report was not yet in final form, the Committee on the basis of the present evidence saw no reason to recommend any substantial change in present practice with regard to the program and/or the *Papers and Proceedings*. It was VOTED to accept the report and ask the Committee to summarize its report, so that we could have a record of its activities and recommendations in the "Proceedings."

6f) *Committee on Professional Ethics* (R. D. Calkins). No report.

6g) *Committee on Academic Freedom and Civil Liberties*. No action.

6h) *Committee on Honors and Awards* (Clair Wilcox). The recommendations of the Committee for the John Bates Clark award, 1961, were considered. Thereupon a balloting took place which resulted in the selection of the recipient. It was VOTED that the Chairman of the Committee on Honors and Awards make the citation and that the award be presented by the President at the presidential address session.

The Committee on Honors and Awards made no recommendations on the question of additional awards, nor on the matter of reconstituting the Committee on Foreign Honorary Members. It was VOTED not to reconstitute the latter Committee at this time.

6i) *Nominating Committee* (A. F. Burns). The Executive and Nominating Committees met as an Electoral College to consider nominees for the office of President-elect, 1962. A panel of names was submitted by the Nominating Committee. After discussing these and other names suggested by members of the Executive Committee, the nominee was selected and his acceptance obtained. Nominations for other officers were discussed. It was VOTED, too, that the Chairman pass on to his successor materials collected by the Committee and a report of its deliberations.

7. *Reports of AEA Representatives and Advisory Committees.*

7a) *IEA* (H. S. Ellis). No report.

7b) *IIE* (Theodore Morgan). No report.

7c) *Asia Foundation Grant*. Another grant of $2,500 has been promised. No further report.

7d) *Economic Internships* (F. C. Pierson). It was reported that the program of internships as at present functioning would permit the appointment of economic interns without the need of additional money. It was VOTED to ask the President to take steps to insure the appointment of an economist to the group selecting interns.

7e) *Census Advisory Committee* (Solomon Fabricant). A brief statement was made concerning the changes made in the membership of this Committee.

The Secretary reported having received an inquiry from the BLS, asking permission to circularize economists interested in wholesale commodity prices with an elaborate questionnaire on this subject.

7f) *Committee on Carnegie Travel Grants* (L. G. Reynolds). No report.

8. *Reports of Representatives.*

8a) *ACLS* (F. H. Knight). Frank Knight gave an oral report on the benefits to be gained by better acquaintance with the activities of the Council in the interest of the constituent societies.

8b) *SSRC* (Gardner Ackley). No report. Gardner Ackley was reappointed to serve another term (1964).

8c) *NBER* (W. L. Thorp). In the absence of W. L. Thorp, Solomon Fabricant reported briefly on the activities of the NBER.

8d) *AAAS* (K. E. Boulding). No report.

9. *Unfinished and Miscellaneous Business.*

9a) *Annual Meeting Places*. After confirming the decision to meet in Boston in 1963, assuming hotel facilities are available, the following action was taken for meeting places: 1965, Washington, D.C.; 1966, Cleveland or Detroit; 1967, New York City. These decisions are not firm commitments but dependent on the availability of facilities, this to be determined by the Secretary.

9b) *Group Insurance for AEA Members*. On recommendation of P. A. Samuelson, it was VOTED to constitute a committee on group life insurance to explore the feasibility of entering into an arrangement with an insurance company which would be of benefit to individual members and the Association as well as to the insurance company.

9c) *Miscellaneous.* Other activities were suggested:

(1) That the Association promote chartered airplane tours to Europe.

(2) Co-operate with foreign associations in promoting student trainee exchange programs.

(3) Undertake to expand the vacancies and applications service in the *AER* and the employment register at the annual meetings and that the Secretary's Office serve as a year-round placement or employment agency for economists.

10. *Program for 1961* (E. S. Mason). The balance of the meeting was devoted to the further consideration of the 1961 program.

The meeting adjourned at 10:30 a.m., March 25.

2. Minutes of the Christmas meetings held in New York, New York, December 26 and 29, 1961:

The *third meeting* of the *1961 Executive Committee* was called to order at 6:30 p.m. at Hotel Commodore, P. A. Samuelson presiding. Others present were: G. L. Bach, J. W. Bell, A. F. Burns, Ewan Clague, Solomon Fabricant, B. F. Haley, C. P. Kindleberger, R. A. Lester, E. S. Mason, T. W. Schultz, and R. A. Young. Absent were: J. K. Galbraith and A. L. Harris. Present as guests were: Roy Blough, Gottfried Haberler, G. H. Hildebrand, B. W. Lewis, W. L. Thorp, Robert Triffin, W. A. Wallis, and H. F. Williamson. The meeting adjourned at 11:30 p.m.

The *first meeting* of the *1962 Executive Committee* was held on December 29 at 6:15 p.m., E. S. Mason presiding. Others present were: J. W. Bell, Ewan Clague, Gottfried Haberler, B. F. Haley, C. P. Kindleberger, R. A. Musgrave, P. A. Samuelson, Robert Triffin, W. A. Wallis, H. F. Williamson, and R. A. Young. Absent were: J. K. Galbraith, A. G. Hart, and T. W. Schultz. Present as guests were: A. F. Burns, Solomon Fabricant, B. W. Lewis, Richard Ruggles, Arthur Smithies, and Lorie Tarshis.

1. *Presidents' Remarks* (P. A. Samuelson and E. S. Mason). Paul Samuelson reviewed the order of items on the agenda, calling attention to unfinished business which might call for action before year-end. These matters were taken up first. However, the minutes follow the order of business as presented in the agenda.

2. *Minutes.* The minutes of the March 24-25, 1961, meeting were approved, with minor corrections on copies sent out in April.

3. *Report of the Secretary* (J. W. Bell). Problems of local arrangements, membership growth and composition, advertising and use of the mailing list, permission to reprint and translate, plans for revision of the *Papers and Proceedings,* printing costs and reprint contracts, problems of office management—these and other matters were reviewed and will be found more fully treated in the Secretary's Report. It was VOTED to approve and accept the report as presented.

4. *Reports of the Treasurer, Finance Committee, and Auditor* (J. W. Bell). The report of the Treasurer was submitted, analyzing the financial operations of the fiscal year 1961 and presenting budgetary estimates for 1962. Budgetary figures for 1962 should be considered tentative, since they are postulated on a simple projection basis and do not take account of appropriations for new projects or unforeseen expenses. It is gratifying to report that instead of an anticipated deficit, we closed the year with a comfortable income and an enlarged surplus.

The Treasurer submitted the report of the Finance Committee, which contains an analysis of our investment holdings and shows purchases and sales made during the year. Although we have taken substantial profits from sales of securities, our present holdings show material appreciation in market value over last year—an appreciation which contributed substantially to the growth of unappropriated surplus.

Attention was called again to an exhibit in the Auditor's Report presenting a statement of foundation funds. Though these funds are indicated as a liability on our statement of financial condition, they are not separated on the asset side but are intermingled, chiefly with investments.

The above reports were accepted, and it was VOTED to reappoint C. Wells Farnham, Corliss D. Anderson, and J. W. Bell as members of the Finance Committee, and the Secretary was instructed to write a letter of appreciation and thanks to these members for their valued services. A similar VOTE of acceptance was passed with respect to the Auditor's Report, and the Secretary was instructed to write a letter of appreciation to David Himmelblau & Company.

5. *Report of the Managing Editor* (B. F. Haley). The report submitted for publication was passed around for inspection. It contains an analysis of manuscripts submitted, sum-

mary of contents, subject-matter distribution, actual expenditures and budget for 1962, and nominations of new members of the Editorial Board.

It was VOTED to accept the report and to approve the nominations of the three new members of the Editorial Board, Martin Bronfenbrenner, A. O. Hirschman, and R. N. McKean, and also to approve the 1962 budget.

It was VOTED to approve a partial sabbatical leave for the Managing Editor, with pay, and the appointment of J. G. Gurley and Lorie Tarshis to serve as acting editor and associate editor during his absence, these editors to be paid the agreed sum by the Association.

The Committee on the Managing Editor Successorship (T. W. Schultz, P. A. Samuelson, and E. S. Mason) recommended the appointment of J. G. Gurley, his three-year term to begin January, 1963. The appointment was approved. Provision was also made for an associate editor, at an annual salary of $3,000. Discretionary powers were given the editors to make appropriate changes in office personnel.

6. *Reports of Standing and Special Committees.*

6a) *Committee on Research and Publications* (W. L. Thorp, acting for Gardner Ackley). Willard Thorp reported that the Committee has held no meetings since March but that new developments have been followed through correspondence. Progress is being made on the "Readings" volumes on Welfare Economics (or a more suitable title), by Scitovsky and Arrow, and a new volume on Business Cycles, by Gordon and Klein (no further progress has been reported on Economic Development, by Millikan and Bruton). New items proposed for the "Translation Series" have not resulted in any positive recommendation. Willard Thorp reviewing the preparation of past volumes of readings, proposed that the budget of approximately $1,000 per volume be increased to $2,000 as a ceiling appropriation. It was VOTED to approve this request.

Cumulative Index Project (J. P. Miller). Paul Samuelson read a letter, dated December 19, 1961, summarizing the status of the cumulative index project and presenting a report on the financial status of this project. The report stated that Volume V of the series should be off the press June, 1962, and then raised the question of future plans for the index project; namely, the compilation of a Volume VI, covering the years 1960-62, and periodical volumes thereafter. No action was taken on this proposal, since it seemed to be somewhat related to the abstract project discussed below.

The question of due recognition of the work done by John Perry Miller and some appropriate recognition for his work which was far beyond the call of duty prompted a recommendation that a sum of $500 be presented him with the grateful thanks of the Association.

G. H. Hildebrand, for the Committee on Surveys of Foreign Economic Research, reported progress has been made on the six essays assigned foreign economists. Only in the case of Scandinavian countries had difficulties been encountered in finding a qualified author.

6b) *Committee on Economic Abstracts* (R. A. Gordon). Arthur Smithies, speaking on behalf of his colleagues, R. A. Gordon and Richard Ruggles, submitted a sample copy of the *Journal of Economic Abstracts,* which he had edited and arranged to have published by Harvard University Press. The sample was enthusiastically received. After considerable discussion of costs, potential circulation among members, libraries, and associated associations, domestic and foreign, it was agreed that we should seek foundation aid to undertake the publication of economic abstracts on an experimental basis. General appreciation was expressed by those present to Arthur Smithies and his colleagues for the extremely effective work done in producing a model sample of economic abstracts.

6c) *Committee on Economic Education* (B. W. Lewis). Ben Lewis reported that no further meetings of this Committee had been held since March, but that further progress had been made on the textbook project, which, though not yet completed, is scheduled for publication in the spring of 1962. A second project of primary interest to the Committee is the teaching of social sciences in the secondary schools, on which we are cooperating with the ACLS. The ACLS committee has assigned papers by specialists in the several social sciences. (B. W. Lewis has done the one in the field of economics, which is scheduled for publication in the spring of 1962.)

6d) *National Task Force on Economic Education* (G. L. Bach). On behalf of the Committee, G. L. Bach reported that twenty thousand copies of the National Task Force report, entitled *Economic Education in the Schools,* together with a summary, had been circulated and that with few exceptions the reception had been quite laudatory. He also reported that the TV program, "National College of the Air," John R. Coleman chief adviser, is scheduled to begin in September, 1962. He explained that the money for this undertaking was not all at hand; hence the importance of the AEA co-operation.

On the project to provide materials for teaching, M. L. Frankel has requested AEA representation on an advisory committee of the Joint Council on Economic Education. It was agreed that the President should make such an appointment.

6e) *Committee on the Papers and Proceedings* (Roy Blough). The final report of this Committee, promised at the March meeting, with appendices, was passed around for inspection. No action was called for. The Committee having served its function was discharged, with thanks.

6f) *Committee on Professional Ethics* (R. D. Calkins). No report.

6g) *Committee on Academic Freedom and Civil Liberties* (F. M. Boddy). No report.

6h) *Committee on Honors and Awards* (Clair Wilcox). No report.

6i) *Nominating Committee.* T. W. Schultz was appointed chairman. A list of names was suggested from which other members might be selected.

7. *Reports of AEA Representatives and Members of Advisory Committees.*

7a) *IEA* (Gottfried Haberler). An announcement of the Second Congress of the IEA, to be held in Vienna, August 30–September 6, 1962, was mailed to all members of the AEA in the U.S. and Canada from the Secretary's Office. The terms of Gottfried Haberler and H. S. Ellis were extended through September, 1962, and to suceed them as representatives through December, 1964, are B. F. Haley and R. M. Solow.

7b) *IIE* (Theodore Morgan). Lorie Tarshis, on behalf of our representatives on the Advisory and Policy Board of the IIE, requested AEA sponsorship for another year, explaining that four summer institutes have taken place at the University of Wisconsin and the University of Colorado, and that a fifth program for graduate students from abroad is being planned for 1962, Wyn Owen, Director. It was VOTED that the AEA continue its sponsorship of the institute.

7c) *Economic Internships* (F. C. Pierson). No report. Committee continued.

7d) *Census Advisory Committee* (Solomon Fabricant). Two meetings of this group were held, one in the spring, the other in the fall. On behalf of the Committee, Solomon Fabricant recommended the enlargement of the Committee. The President was authorized to suggest further names for the Committee.

7e) *Asia Foundation Grant.* J. W. Bell reported that a number of travel aid grants had been made to graduate students from Asiatic countries to enable them to attend the annual meetings and that most of the balance of the $2,500 grant received has been spent on one-year complimentary memberships and subscriptions. A small balance still remains.

7f) *Committee on Carnegie Travel Grant* (L. G. Reynolds). This Committee (L. G. Reynolds and F. H. Harbison and E. S. Mason and H. F. Williamson, ex officio) is being continued as constituted in 1959 until the fund is exhausted.

8. *Reports of Representatives.*

8a) *ACLS* (F. H. Knight).

8b) *SSRC* (W. H. Nicholls).

8c) *NBER* (W. L. Thorp).

8d) *AAAS* (K. E. Boulding).

Reports received at the meeting and after are published below.

9. *Unfinished and Miscellaneous Business.*

9a) *Annual Meetings.* Meeting places for 1965, 1966, and 1967 were reconsidered in the light of the request from the American Statistical Association to meet in Washington, D.C., in 1967. It was VOTED to shift our choice of Washington from 1965 to 1967 in order to be able to hold the all-out, joint meeting there at that time. The decision as to 1965 and 1966 was delegated to President Mason and Secretary Williamson, who recommended that we hold our 1965 meeting in New York, and that the decision on the 1966 meeting be made at the meeting of the Executive Committee in March.

9b) *Committee on Group Insurance* (W. A. Wallis). Allen Wallis reported informally on the deliberations of the Committee and explained that the Committee was not prepared to recommend that the Association adopt a group insurance plan for its membership. After discussion, it was decided to make the announcement at the Business Meeting that such a plan had been considered and that if there is a marked response on the part of members for this service, the matter will be reconsidered.

9c) *Counsel for the AEA.* President Mason was asked to consult with P. A. Samuelson and to bring a recommendation for an appointment to the March meeting of the Executive Committee.

9d) *Committee on Foreign Honorary Members.* It was generally agreed that this committee should be reconstituted, and the President was authorized to appoint its members and report at the March meeting.

9e) *Information Clearing House of Service to Foreign Scholars Coming to the U.S.* (IIE). It was decided to postpone discussion on this matter until the March meeting.

The meeting of December 29 adjourned at 9:45, to be reconvened in New York City, March 23-24, 1962.

ACTIVITIES AND OPERATIONS

Annual Meetings. The final report on the 1960 St. Louis meetings showed a total registration of 3,185, of which 1,420 were members of the American Economic Association. Although this meeting was not an all-out joint meeting of the members of the allied social science group, ten associations were represented. From the proceeds of a $2.00 registration fee, exhibits, and advertising income, a total of $6,946.10 net revenue was obtained. Of this sum, the AEA received, on the basis of gross registration, $3,957.64, or 53.87 per cent.

The Local Arrangements Committee for the 1961 New York meetings, J. Robert Lindsay, Chairman, reported a record breaking attendance and generally favorable results of the arrangements made. Details will be made available for presentation at the spring meeting of the Executive Committee.

The schedule for future meetings is: 1962, Pittsburgh, Penn-Sheraton Hotel; 1963, Boston, Statler Hilton Hotel; 1964, Chicago, Conrad Hilton Hotel. Plans for 1965, 1966, and 1967 are being reconsidered.

Membership. Exhibit II below shows only a slight gain of approximately 100 in total members and subscribers over the past year (a gain of 217 members and a loss of 119 subscribers). The annual increases for a number of years prior to 1956—the year of the directory *Handbook*—was approximately 200. Membership increases usually accompany the publication of the "who's who" type of directory and total members and subscribers increased 1,067 in that year. In 1957, the increase was 507, in 1958, 756, and in 1959, partly as the result of the processing of selected lists of names, the increase totaled 1,170. In 1960, growth remained large, i.e., at 872, but fell off to 100 in 1961 (this latter figure is subject to correction).

It is not possible to present the usual analysis of memberships with assurance of accuracy nor to give a meaningful account of our drops and reinstatements. Last year, about one out of every nine members was dropped for nonpayment of dues after having received the March number of the *American Economic Review*, and, after receiving two reminders, about six of the nine paid up and were reinstated.

This year's experience shows similar results, about 930 of the 10,000 members being dropped after receiving the March number and roughly 650 later reinstated. There has been some improvement in our billing and collection experience since we decided to drop members for nonpayment of dues after receiving one number of the *AER* instead of three. The results could be further improved by earlier billings, at the end of the fiscal year and before the Christmas rush.

With respect to composition, the increase in the number of junior members is gratifying, since, though not revenue producing, it indicates a presumption of future growth.

Publications. The 1960 contract with George Banta Company has worked out to our mutual satisfaction; though the costs have increased somewhat, so have the services. New estimates of printing costs from other publishers have been obtained, and on the face of original estimates, some bids appear to be better than our Banta contract, but upon further examination, we discover that the low bidder has inadequate facilities to service our very substantial inventory of back numbers or in some other particular is unable to service our needs.

American Economic Review. The report of the Managing Editor, published below, covers size, contents, cost of printing the *Review*, budget estimates, and changes in the Editorial Board. The Secretary's Office is concerned chiefly with the mailing, permissions to reprint and translate, advertising, the section devoted to announcements of vacancies and applications, and the over-all use of the mailing list. The size of the advertising section has been increased slightly and runs about 194 pages for 1961, of which about two-thirds are exchange ads, producing information but not revenue. The announcement section, of 4 or 5 pages, totaling 18¼ pages in 1961, which is fairly representative of its size over the past number of years, continues to provide useful information to those seeking employment or a change of jobs, as well as to employers of economists, academic, governmental, and business. The chief shortcoming of this service is that announcements can only be made quarterly and positions and vacancies often need to be taken care of more promptly. This shortcoming also applies to the other service we offer to economists, members and nonmembers alike; namely, the employment register conducted in cooperation with the USES at the annual meetings of the Association. Much discussion has taken place concerning the establishment of year-round facilities, but so far such a step has proved impractical because of the cost of its administration. *If* the results of a sample survey on "facilities useful in getting jobs" is to be taken literally, the free services provided by the AEA are hardly worth the costs involved in rendering them. The almost feverish activity of the employment register service conducted at the annual meetings and the active correspondence generated by the announcement section in the *Review* are convincing direct evidence that a demand for these services does exist. Perhaps we should test this demand by levying a charge or application fee for these services, and if we should discover that there was some reluctance in the payment of these fees, we would be justified in leaving to others the performance of these services. Those interested can learn more about these problems by referring to the 1959 *Papers and Proceedings*, "Round Table Conference on the Market for Economists: Demand and Supply Aspects," and the sequel session held at the 1961 annual meetings.

Papers and Proceedings. The size and costs of the May, 1961 volume again exceeded projected plans, although every means was employed to keep the volume within budget estimates. The final report of the Committee on the *Papers and Proceedings* calls attention to the problem of improving quality and reducing costs.

Directory or Handbook. A revision of the "who's who" type of directory or handbook was authorized, "if feasible," at the March, 1960, meeting of the Executive Committee. Some progress was made in planning the revision, but we have not yet formally undertaken the preparation and editing of a new directory at this time. We have obtained estimates from outside concerns of the costs of printing and editing a handbook in letterpress and by new photomachine processes. We have made an agreement with a data processing company to put the membership and subscription records on IBM cards, which promises to mechanize the processing of questionnaires, especially the classification of fields of interest and areas of activity. We have taken some steps in preparing a questionnaire and in bringing up to date materials for several of the exhibits.

Permission to Reprint and Translate. The list of permissions to reprint articles from the *Review* and papers from the *Papers and Proceedings* or to quote, *in toto* or in part, or to translate totals 138 items compared to 149 permissions in 1960. We have been liberal with the use of this privilege, suggesting that an honorarium or stipend be paid only in cases where the reprint permission was used for commercial purposes rather than classroom direct. In some instances, this liberality has been abused. I recommend that we adopt the practice of a uniform charge for reprinting whole articles: $25 for the Association and $25 for the author.

Use of Mailing List and Direct Advertising. Since taking over from Banta the function of addressing our publications and communications, the cutting of stencils and the operating of the Elliott addressing machine have become an increasingly arduous part of our office operations. In addition to the five mailings of our publications and two mailings—ballot and dues bills—we have rented out our mailing list for use by publishers and other organizations at rates corresponding to those paid for magazine advertisements. It was partly with this in mind that we shifted billing and mailing operations to an outside data processing concern. The breaking-in period of this arrangement has proved to be costly and protracted. We have derived less income from renting out the use of the mailing list in 1961. We have lost business in cases where publishers object to mailings with pasted-on labels or window envelopes or because of the extra expense of printing pin feed type of envelopes. This raises the over-all problem of office management.

Office Management. The problems of operating the secretarial office become more complicated as we grow in size and as our functions multiply. We have reached a stage where the job of the Secretary-Treasurer threatens to become more than a part-time job. Hence we face the choice of enlarging the office personnel or of contracting out certain operations to outside firms. With this in mind and seeking the advantages of automation processes, we entered into a contract with a data processing concern, specializing in putting records on IBM cards, at the cost of $10,000 a year. We had anticipated reducing the work load in the Secretary's Office by the mechanical processing of routine operations and procuring facilities for improving services performed and undertaking new services for our members should the Executive Committee elect to do so. The peparation of the questionnaire for the revision of the Directory Handbook, which is now overdue, immediately suggested a mechanized punchhole processing of a refined classification of members; increased bookkeeping and accounting functions could be farmed out to the data processing concern; membership promotions could be facilitated by use of IBM lists; and new services, such as a group insurance plan, if authorized, could be implemented by the use of data processing. A questionnaire could be designed to record insurance applications and payment records could be kept on punch cards along with payment of dues and subscriptions. These and other proposals, e.g., conducting a continuous employment register, chartering planes for economic meetings, are hardly feasible for the office of a part-time Secretary-Treasurer but could be delegated to outside agencies. Our experience up to date has made us a little less sanguine about the efficiency of automation processes. We have received but three lists and only one complete count of members and subscribers, and data furnished does not enable us to distinguish dropped and reinstated members from new members, so that we are unable to tell at any given time whether or not to send out repeat dues bills or reminders or if they are effective if sent. We have not been able to reduce the office personnel. It has changed the character of their work from manual processing to feeding data to the agency and correcting mistakes, which often involve a good deal of unpleasant correspondence. However, we are committed to the experiment and trust that the bugs will soon be eliminated.

We are continuing to investigate the feasibility of entering into an arrangement with reprint companies for the reproduction of out-of-print numbers and for the storage and distribution of our publications. The advantage of this arrangement would be that out-of-print numbers would always be made available if these could not be furnished in the secondhand market and from dealers direct, so that this office would be relieved of much work and some expense. The disadvantage of such arrangement would be the costs involved to the individuals directly concerned. The cost of a lithoprint issue of the *AER* would be approximately $9.00 compared to the list price of $1.25-1.50. We have been able to replace out-of-print issues by advertising in the *AER* to repurchase copies at fifty to seventy-five cents a copy and are further testing the secondhand market by running an ad in the December *AER*, offering to buy all out-of-print numbers of the *AER* since 1911. Handling costs are absorbed by us and secondhand copies are supplied at a great saving to our members and subscribers. An inquiry from the ACLS (March 14, 1961) suggested that a group of associations enter into a nonprofit, co-operative arrangement for storage and distribution of publications. We try to keep informed about these developments.

Committee Activities. See list of committee members at the end of this report. Also refer to minutes and reports of chairmen for full account of committee activities.

Research and Publications (Gardner Ackley; W. T. Thorp, acting). No meetings were held during the year but a good deal of correspondence took place concerning the readings series, translations, and survey volumes. The activities of the Committee with regard to translations has been held in abeyance pending implementation of the translation of foreign classics project provided for by the Ford grant of $25,000. The *Survey* Volumes I and II have been succeeded by survey articles contributed to the *American Economic Review*. These are being financed by a Rockefeller grant of $13,000.

A Volume III of the "Survey Series" may eventually materialize if these articles should be compiled.

Related to the Committee on Research and Publications survey activities is the Committee on Surveys of Foreign Economic Research, of which G. H. Hildebrand is Chairman. This Committee is operating with a $40,000 Ford grant, has commissioned six essays so far by foreign scholars, which are scheduled for completion by late summer of 1962. These essays will involve a commitment of about $9,000-10,000 of the grant.

The cumulative index project, directed by J. P. Miller, is practically completed. Three volumes are now out and Volumes IV and V will soon be on the market. This raises the question of continuing the index and issuing periodically supplements to keep it up to date.

Richard D. Irwin, Inc., is publisher of the *Index* volumes as well as the readings volumes under way. Our relationship with Richard D. Irwin, Inc., continues to be satisfactory. A recent report, which covers operations through October 30, 1961, shows that we are at the present time in a break-even position with respect to net profit or less and that we have an inventory of 264 bound copies of *Survey* Volume II and 3,946 copies of *Readings* Volumes I-IX and 5,555 bound copies of Volumes I-III of the *Index of Economic Journals.*

Economic Education (B. W. Lewis). The activities of this Committee have been concentrated on (1) the textbook project and (2) co-operative study of the social sciences in the secondary schools with the Councils.

The textbook study, directed by Paul Olson and edited by B. W. Lewis, has been approved for publication. A closely related project, done co-operatively by CED and JCEE, has resulted in a recent publication entitled, *Study Materials for Economic Education in the Schools.*

The joint study of the social sciences in the secondary schools, sponsored by ACLS, will soon produce a volume consisting of a series of essays contributed by representatives from the several fields concerned. Professor Lewis has prepared the paper on "Economics in the Secondary Schools."

The National Task Force on Economic Education has recently submitted its report on *Economic Education in the Schools,* which, with a summary of the report, is published by the CED.

Further progress is being made on the CED-financed Continental Classroom, which is cosponsored by the American Economic Association.

The Committee on *Papers and Proceedings,* a committee succeeding the Committee on the Association Deficit, has submitted a final report. No reports have been received from the Committees on Academic Freedom and Civil Liberties, Professional Ethics, or on economic internships. The Committee on Honors and Awards will probably become active again in time to submit a report for the spring meeting.

The Committee on Carnegie Travel Grants has been given new life and is to function until the funds are exhausted. The $2,500 grant of the Asia Foundation is being used to aid Asian students in American universities and colleges to attend annual meetings of the Association and also to subsidize memberships and library and institutional subscriptions.

Reports from Association representatives to IIE, Census, and to the SSRC, ACLS, NBER, and AAAS are published below.

Standing Committees

CENSUS ADVISORY COMMITTEE

Solomon Fabricant, *Chairman* (1963)
Harold Barger (1961)
John Lintner (1961)
Arthur M. Okun (1961)
Millard Hastay (1962)
Anthony M. Tang (1962)
Carl Kaysen (1963)
H. Gregg Lewis (1963)
Morris A. Adelman (1964)
Edward F. Denison (1964)

COMMITTEE ON ACADEMIC FREEDOM AND CIVIL LIBERTIES

Francis M. Boddy, *Chairman* (1963)
Howard R. Bowen (1961)
Walter D. Fisher (1962)

COMMITTEE ON ECONOMIC ABSTRACTS

Robert A. Gordon, *Chairman*
Gardner Ackley
William H. Nicholls
Joseph J. Spengler

COMMITTEE ON ECONOMIC EDUCATION

Ben W. Lewis, *Chairman* (1962)
Clark C. Bloom (1961)
Floyd A. Bond (1961)
Laurence Leamer (1961)
Clark L. Allen (1962)
Kenyon Knopf (1962)
John R. Coleman (1963)
Edgar O. Edwards (1963)
Emanuel T. Weiler (1963)

COMMITTEE ON HONORS AND AWARDS

Clair Wilcox, *Chairman* (1962)
Gardner Ackley (1964)
Kenneth J. Arrow (1964)
Fritz Machlup (1964)
Martin Bronfenbrenner (1966)
Earl J. Hamilton (1966)

COMMITTEE ON PAPERS AND PROCEEDINGS

Roy Blough, *Chairman*
J. Douglas Brown
Joseph W. Conard
William J. Fellner
Milton Friedman

COMMITTEE ON PROFESSIONAL ETHICS

Robert D. Calkins, *Chairman* (1961)
Joseph Dorman (1961)
Richard Ruggles (1961)

COMMITTEE ON RESEARCH AND PUBLICATIONS

Gardner Ackley, *Chairman* (1962)
W. H. Nicholls (1962)
G. H. Hildebrand (1963)
Willard L. Thorp (1965)
James Washington Bell, Ex Officio

COMMITTEE ON SURVEYS OF FOREIGN ECONOMIC RESEARCH

George H. Hildebrand, *Chairman*
Abram Bergson
Martin Bronfenbrenner
Emile Despres
Robert J. Lampman

CUMULATIVE INDEX ADVISORY COMMITTEE

John Perry Miller, *Chairman*
Robert Bishop
Earl J. Hamilton
Fritz Machlup
Joseph J. Spengler

INSTITUTE OF INTERNATIONAL EDUCATION, ADVISORY AND POLICY BOARD

Theodore Morgan, *Chairman*
Rendigs T. Fels
Carter Goodrich
Michael Hoffman
D. Gale Johnson
Irving B. Kravis
Lorie Tarshis

NATIONAL TASK FORCE ON ECONOMIC EDUCATION
ECONOMIST MEMBERS

George Leland Bach, *Chairman*
Floyd A. Bond, *Executive Secretary*
Lester V. Chandler
Robert A. Gordon
Ben W. Lewis
Paul A. Samuelson

CONSULTING MEMBERS

Arno Bellack
M. L. Frankel

Council and Other Representatives

AAAS

Kenneth E. Boulding (1962)

ACLS

Frank H. Knight (1962)

IEA REPRESENTATIVES

Howard S. Ellis (1962)
Gottfried Haberler (1962)

NBER

Willard L. Thorp (1965)

SSRC

Gardner Ackley (1961)
William H. Nicholls (1962)
George H. Hildebrand (1963)

Committees Appointed During the Year

COMMITTEE ON ELECTIONS

Rolf A. Weil, *Chairman*
Robert H. Strotz
James Washington Bell, Ex Officio

COMMITTEE ON GROUP INSURANCE

W. Allen Wallis, *Chairman*
Joseph A. Pechman
Harold F. Williamson

FINANCE COMMITTEE

C. Wells Farnham, *Chairman*
Corliss D. Anderson
James Washington Bell, Ex Officio

NOMINATING COMMITTEE

Arthur F. Burns, *Chairman*
William C. Hood
James W. McKie
Arthur M. Okun
Daniel C. Vandermeulen
Janet L. Weston

Representatives of the Association on Various Occasions

DETROIT INSTITUTE OF TECHNOLOGY, INAUGURATION OF ACADEMIC CHAIR HONORING A. VERNON JANNOTTA
Lawrence H. Seltzer

ECONOMIC ASSOCIATIONS OF DENMARK, SWEDEN, FINLAND, AND NORWAY
Oslo, Norway, Meeting
Finn B. Jensen

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CENTENNIAL CONVOCATION
Edward S. Mason

U. S. NATIONAL COMMISSION FOR UNESCO, EIGHTH NATIONAL CONFERENCE
Max F. Millikan
VASSAR COLLEGE, ONE HUNDREDTH ANNIVERSARY CONVOCATION
Margaret G. Myers

INAUGURATIONS

G. Homer Durham, Arizona State University
W. G. Becker
George Wells Beadle, University of Chicago
James Washington Bell
Donald Carlyle Moyer, Eastern New Mexico University
Julian Smith Duncan
John P. Leary, Gonzaga University
John A. Guthrie
Randle Elliott, Hood College
Olive I. Reddick
Harold Philip Hamilton, Kentucky Wesleyan College
Thomas H. Reynolds
Everett Lewis Cattell, Malone College
Boyd Z. Palmer
Dean Wallace Colvard, Mississippi State University
Robert N. Howell
Erling N. Jensen, Muhlenberg College
Elmer C. Bratt
John Rutherford Everett, Municipal College System of the City of New York
Jerome B. Cohen
Edward J. Mortola, Pace College
Matthew Simon
Leland E. Traywick, Southwest Missouri State College
Glenn Downing
Chauncey Goodrich Bly, Thiel College
Alfred N. Hull
Herbert Eugene Longenecker, Tulane University
W. David Maxwell
George Richard Edwin Shell, Virginia Military Institute
Lewis W. Adams
Arthur Ole Davidson, Wagner College
Eveline M. Burns
Thomas Henry Carroll, George Washington University
Robert D. Calkins
James W. Miller, Western Michigan University
Sherrill Cleland
Davis Young Paschall, College of William and Mary
Hibbert B. Corey
James Morgan Read, Wilmington College
William W. Hewett

Use of the Mailing List

Permission was granted to the following to use our mailing list to send the material indicated:

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE: Membership invitation

AFL-CIO: Publications offer

ATLANTIC MONTHLY: Subscription offer

BASIC BOOK SERVICE: Membership invitation

BOLTON TREMBLAY COMPANY: Announcement of service and publications

BUREAU OF NATIONAL AFFAIRS: "BNA's Report for the Business Executive"

JAQUES CATTELL PRESS: To prepare list for 10th Edition, *American Men of Science*

CHALLENGE: Subscription offer

FREDERICK CHUSID AND COMPANY: Special position offer

COMMITTEE FOR ECONOMIC DEVELOPMENT: *The Education of a Businessman; Growth and Taxes;* to prepare a mailing list

COMMITTEE FOR HIGHER EDUCATION IN NEW YORK STATE: *Report*

COMMERCIAL CREDIT COMPANY: "Commercial Credit Insurance as a Management Tool," by Clyde W. Phelps

DEERE AND COMPANY: *Facts about John Deere Tractor Wholesale Prices*

FORD FOUNDATION: "Fellowship Announcements for Regional Faculty Research Seminars in Economics"

FOUNDATION FOR THE STUDY OF CYCLES: Membership invitation

FREE PRESS OF GLENCOE: Special scholarly sales circular; promotion, *Economic Areas of the U.S.*, by D. J. Bogue and C. L. Beale; catalogue; promotion, *Theories of Society*

FUND FOR THE ADVANCEMENT OF EDUCATION: *Meeting the Increasing Demand for Higher Education in New York State*

GENERAL ELECTRIC COMPANY: *Annual Report, 1960;* "G. E. Relations News Letter"

HARPER AND BROTHERS: Promotion, *Worldmark Encyclopedia*

JOHN S. HEROLD, INC.: Promotion, *America's Fastest Growing Companies*

UNIVERSITY OF ILLINOIS, BUREAU OF ECONOMIC AND BUSINESS RESEARCH: Announcement of *Quarterly Review of Economics and Business* and of series of books

INSTITUTE OF LIFE INSURANCE: *Life Insurance Fact Book—1961*

INTERNATIONAL ECONOMIC ASSOCIATION: Announcement of IEA Vienna Congress, 1962

RICHARD D. IRWIN, INC.: To bring their AEA mailing list up to date

JOINT COUNCIL ON ECONOMIC EDUCATION: Abstract of original research from *Pension Funds and Economic Power*, by P. P. Harbrecht, abstracted by E. M. Zimmerman

LIBRARY OF SCIENCE: Fifth Anniversary membership invitation and gift book offer

LOUISIANA STATE UNIVERSITY: Announcing *Economic Growth in the U.S.,* by Sumner H. Slichter, and *Keynesian Economics in the Stream of Economic Thought,* by H. L. McCracken

McGRAW-HILL BOOK COMPANY: Promotion, *Practical Handbook Library in Mathematics and Statistics*

MERCK AND COMPANY: "Competition in the World Markets," by J. T. Connor

UNIVERSITY OF MICHIGAN: *Behavioral Science,* subscription campaign

MORGAN GUARANTY TRUST COMPANY: *Morgan Guaranty Survey,* August issue

NATIONAL ASSOCIATION OF MANUFACTURERS: Booklet, *Foreign Competition;* "Unemployment—Causes and Cures"; statement of Charles R. Sligh, Jr., before House Ways and Means Committee

NATIONAL PLANNING ASSOCIATION: *The Economy of the American People*

THE NEW REPUBLIC: Subscription offer

NEWSWEEK: Special offer to new subscribers

PROCTER AND GAMBLE: "Some Aspects of U.S.-Canadian Relations," by Neil McElroy

PRUDENTIAL INSURANCE COMPANY OF AMERICA: *Prudential's Annual Economic Forecast*

QUARTERLY REVIEW OF ECONOMICS AND BUSINESS (University of Illinois): Promotion

REPORTER MAGAZINE: Subscription offer

RONALD PRESS COMPANY: Book offer

ROOSEVELT UNIVERSITY: Announcement of Edward A. Filene lecture series.

Respectfully submitted,

JAMES WASHINGTON BELL, *Secretary*

EXHIBIT I

PUBLICATION COSTS

Papers and Proceedings				Handbooks		
Year*	Number of Pages	Number of Copies	Cost	Number of Pages	Number of Copies	Cost
1931	308	4,300	$ 1,919	88	4,200	$ 589
1936	360	4,200	2,037	58	4,100	454
1940	444	4,900	2,657	108	5,000	822
1942	548	5,400	3,909	208	5,500	1,775†
1943	535	5,500	3,652			
1944	470	5,800	3,350			
	144	5,900	1,215‡			
1945	536	6,400	4,502			
1946	960	6,700	8,149	143	6,900	2,035
1947	781	7,700	8,140			
1948	591	8,500	8,701	345	7,700	6,948†
1949	537	9,500	7,844			
1950	650	10,100	9,864	41	9,200	1,163†
1951	816	10,400	11,965	18	8,300	692†
1952	768	10,700	13,190	11	8,188	620†
1953	612	10,900	10,935	187	8,400	4,416
1954	765	11,000	13,932	11	7,900	660†
1955	711	11,000	12,900	8	8,000	540†
1956	651	11,200	12,115			
1957	754	12,400	16,253	548	10,100	15,815†
1958	677	12,700	15,471	32	9,300	1,434†
1959	689	14,000	16,780			
1960	745	14,800	18,914			
1961	675	15,800	19,759			

* This is the year of publication and pertains to the meeting of the preceding year. The figures are published in the subsequent year.

† "Who's who" volumes; 1950 and 1958—"Who's who" supplements; others—names and address supplement.

‡ Part of papers presented at annual meeting published as supplement to June number.

EXHIBIT II

MEMBERS AND SUBSCRIBERS*

	Totals 11/30/60	Gain or *Loss*	Totals 11/30/61
Class of membership:			
Annual	9,400	178	9,578
Junior	1,056	6	1,062
Family	150	9	159
Complimentary	75	2	77†
Life	142	22	164
Honorary	14	—	14
Total members	10,837	217	11,054
Subscribers	4,053	*119*	3,934
Totals	14,890	98	14,988

* These figures should not be considered definitive, since reports received from our data processing agency are not yet complete.

† Includes 19 who do not receive publications.

REPORT OF THE TREASURER FOR THE YEAR ENDING NOVEMBER 30, 1961

The financial condition of the Association and the results of operations over the past year are shown in the following tables. The first table shows comparative financial status this year compared to last and, for purposes of perspective, 1952. The second table shows income and expense items for the same years.

Financial Operations. Income from all sources for the fiscal year 1961 amounted to approximately $144,000, which is slightly larger than last year and substantially larger than budget estimates. Total expenses, amounting to approximately $126,000, were substantially in excess of last year's expenses though well within budget estimates. Net operating income of $18,000, although less than net income for 1960, is in sharp contrast to the deficit anticipated in budgetary estimates. Even after taking account of unanticipated deficit appropriations for the cumulative index project and of the accrued liability for the next revision of the Directory or Handbook, there remains a comfortable net income of around $8,700. This compares with the budgetary estimate of a $4,000-odd deficit.

The differences between results and forecasts are due chiefly to the following: Under income, membership dues and subscriptions increased slightly according to expectations. Sales unaccountably decreased. Advertising dropped slightly whereas we had expected an increase. The sale of the mailing list was less than last year and substantially under forecasts. On the other hand, we had budgeted no profit on sales of securities, whereas in fact we took an even larger profit this year than last, nor had we budgeted a surplus for the annual meeting.

Under expenses, office salaries increased, although not as much as budgeted. Other administrative expenses decreased a shade, whereas an increase had been budgeted, but a new item of $6,000 for IBM service accounted for operating expenses equal to the amount budgeted and larger than 1960. Printing costs of the *Review* increased and this was anticipated, although the amount paid to contributors was reduced. These factors resulted in a smaller increase in expenses than was allowed for in our budgetary estimates and account in part for the gratifying net operating income figure.

An examination of Association income and expenses can be readily seen over a period of time by referring to Exhibit I of the Deficit Committee's report, *Papers and Proceedings,* May, 1959, page 656, which reviews income and expenses, 1948 through 1958, and the Treasurer's reports in the *Papers and Proceedings,* May, 1960, pages 282-83 and 1961, pages 218-19.

The Committee on Association Deficit in Exhibit II made a comparison of investment income to income from all sources. Without reproducing these figures, it is of interest to know that the 12 per cent in 1959 increased to over 16 per cent in 1960 and still remains at over 15 per cent in 1961.

The following table shows total investments at year-end 1960 and 1961:

Investment		1960	1961	Increase *Decrease*
At cost:	Bonds..............	$160,508	$169,794	$ 9,286
	Stocks.............	94,910	109,071	14,161
	Total............	$255,418	$278,865	$23,447
At market:	Bonds..............	$157,911	$167,685	$ 9,774
	Stocks.............	141,980	188,491	46,511
	Total............	$299,891	$356,176	$56,285
Net increase, market over cost.....		....	....	$32,838

Budget Analysis. The financial results of the past year were much better than anticipated for reasons which become obvious on examination of the changes in income and expenses referred to above. For example, we cannot count on taking profits on sale of securities, especially during periods of market uncertainties; nor would we expect the annual meetings to produce surplus net earnings. An innovation in our office management was instituted, and this experiment with IBM automation has proved to be unexpectedly difficult and also expensive, and future adjustments cannot be reckoned beforehand. The use or non-use of outside foundation funds cannot be calculated with precision.

The deficit item of appropriations, $5,417, which must be deducted from net operating income, is in fact provided for by Association appropriations of $9,000 ($6,500 plus $2,500) to see the cumulative index project through. This could not be foreseen and hence was not carried as a contingent liability on last year's statement. Also contingent, but not definite enough to take into account on our statement, is the $2,500 appropriation on the Walras project. Commitments of uncertain character often make it difficult to devise an appropriate accounting. For example, our share in the underwriting of six hundred copies of the UNESCO volume, *University Teaching of the Social Sciences: Economics,* was a contingency which never materialized.

In the light of experience, 1962 budget figures are presented with great hesitance and misgivings. Some items are fairly calculable; others can throw the whole picture out of balance. For instance, the cost of a Directory or Handbook volume if contracted out would probably be around $50,000 to $60,000, and undertaking a new services for our members, such as group insurance plans, could throw the budget off balance. Our best judgment is that we face another deficit next year, a modest one, with which we can ride along for a few more years without increasing dues if it continues to be our policy in subsidizing our members and subscribers.

Respectfully submitted,

JAMES WASHINGTON BELL, *Treasurer*

Comparative Financial Condition, 1952, 1960, and 1961

	11/30/52	11/30/60	11/30/61
Assets			
Cash on deposit and on hand	$ 7,498	$ 16,094	$ 13,469
Receivables (net)	2,995	10,455	11,095
Prepaid expenses and inventories	937	646	1,911
Furniture and fixtures (net)	1,742	2,168	1,729
Investments at cost:			
Bonds	42,313	160,508	169,794
Stocks	58,934	94,910	109,071
Total assets	$114,419	$284,781	$307,069
Liabilities and Funds			
Accounts payable	$ 7,797	$ 12,066	$ 13,116
Deferred income	7,044	12,803	13,767
Membership extension fund	707	—	—
Committee on Graduate Training in Economics	2,656	—	—
Committee on Public Issues	810	—	—
Committee on Research and Publications	3,762	353	353
Committee on Economic Education	—	108	108
Committee on *Papers and Proceedings*	—	250	250
Outside grant:			
Index of economic journals (Ford)	—	931	5,417*
Register of economists (Ford)	—	1,836	1,836
Economic abstracts (Ford)	—	—	7,000
Social studies survey (Ford)	—	12,681	12,681
Foreign economic research translations (Ford)	—	25,000	25,000
Foreign economic surveys (Ford)	—	39,085	39,085
Survey articles (Rockefeller)	—	4,375	3,200
Travel grant (Carnegie)	—	2,539	2,239
Asia Foundation grant	—	1,243	2,162
Sundry	—	623	611
Life memberships	6,225	14,100	16,300
Total liabilities and funds	$ 29,001	$127,993	$132,291
Surplus			
Balance at beginning of period	$ 81,372	$129,072	$156,788
Transfers from life memberships	225	1,100	100†
Net income or loss for period	3,821	26,616	18,090
Unappropriated surplus	$ 85,417	$156,788	$174,778
Total footings	$114,419	$284,781	$307,069

* Denotes red.

† Reinstated life member.

Comparative Results of Operations, 1952, 1960, and 1961

	11/30/52	11/30/60	11/30/61	1962 Budget
Income				
Membership dues	$41,340	$ 59,208	$ 61,980	$ 63,000
Subscriptions	15,825	23,360	24,610	25,000
Sales	2,266	3,456	3,241	3,500
Advertising	7,066	20,976	19,614	21,000
Republications income	—	723	5,439	—
Sale of mailing list	—	8,521	6,338	10,000
Sundry income	973	154	816	500
Dues and publications income	$67,470	$116,398	$122,038	$123,000
Interest	$ 1,118	$ 6,693	$ 5,460	$ 5,500
Dividends	3,681	3,772	4,143	4,500
Less custodian fees	179*	312*	381*	—
Profit on sales of securities (net)	3,569	12,392	12,712	—
Investment income (less fees)	$ 8,189	$ 22,545	$ 21,934	$ 10,000
Total income	$75,659	$138,943	$143,972	$133,000
Expenses				
Office salaries	$14,537	$ 28,046	$ 30,598	$ 28,000
Accounting service (IBM agency)	—	—	6,000	10,000
Other administrative expenses	3,942	9,010	8,740	8,000
Annual meeting	644*	5,125*	2,592*	—
Executive Committee	1,952	2,173	1,803	2,000
Other committee expenses	758	822	827	800
Review moving expenses	477	—	—	—
Administrative and operating expenses	$21,022	$ 34,925	$ 45,376	$ 48,800
Review printing	$24,561	39,429	$ 41,123	$ 45,000
Papers and Proceedings printing	13,191	18,915	19,759	20,000
Directory printing	620	—	—	—
Editorial office (*Review*):				
Contributors	2,299	2,866	1,458	2,000
Editorial and clerical salaries	9,493	15,166	17,468	17,600
Other expenses (net)	652	525	698	700
Publications	$50,816	$ 76,901	$ 80,506	$ 85,300
Total expenses	$71,838	$111,827	$125,882	$134,100
Net operating income or loss	$ 3,821	$ 27,116	$ 18,090	$ 1,100*
Appropriations	—	500*	5,417*	—
Accrual liability of *Directory*	—	4,000*	4,000*	4,000*
Net income or deficit	$ 3,821	$ 22,616	$ 8,673	$ 5,100*

* Denotes red.

INVESTMENT PORTFOLIO

Year	AT PAR	COST			MARKET
	Bonds	Bonds	Stocks	Total	Stocks and Bonds
1925	$ 25,000	$ 24,661		$ 24,661	
1930	31,000	32,439		32,439	
1933	33,500	32,962	$ 3,954	36,916	$ 31,522
1935	16,000	15,280	28,114	43,394	50,338
1940	25,000	22,519	41,155	63,675	60,553
1942	27,000	24,651	41,556	66,207	58,211
1945	40,000	36,705	44,955	81,661	103,574
1948	35,000	33,108	48,624	81,732	84,841
1950	35,000	33,108	51,978	85,087	104,177
1951	43,000	43,340	49,764	93,104	117,316
1952	42,000	42,312	58,934	101,246	130,836
1953	68,000	68,308	46,458	114,766	134,562
1954	61,000	61,518	38,082	99,600	132,280
1955	75,000	75,370	59,394	134,764	166,772
1956	75,000	75,370	60,237	135,607	168,337
1957	75,000	75,370	55,084	130,454	151,638
1958	75,000	75,370	67,741	143,111	175,609
1959	75,000	75,386	67,652	143,038	191,506
1959*	175,000	175,616	67,652	243,268	291,506
1960*	160,000	160,508	94,910	255,418	299,768
1961*	170,000	169,794	109,071	278,865	356,131

* Includes bonds held in temporary operating fund.

RETURN ON INVESTMENTS

Year	Bonds	Stocks	Total	Rate of Return on Cost
1925	$1,350		$ 1,350*	
1930	1,695		1,695	5.22%
1933	1,679	$ 108	1,788	4.84
1935	1,022	680	1,703	3.92
1940	1,037	2,182	3,220	5.06
1942	1,306	2,186	3,492	5.28
1945	1,479	2,488	3,968	4.71
1948	1,194	2,944	4,139	5.06
1950	1,117	3,860	4,977	5.85
1951	1,026	4,607	5,633	6.05
1952	1,117	3,681	4,799	4.75
1953	1,435	3,587	5,022	4.36
1954	1,621	2,961	4,582	4.58
1955	1,750	3,002	4,752	3.53
1956	1,770	3,336	5,106	3.76
1957	1,770	3,397	5,167	3.90
1958	1,770	3,182	4,952	3.46
1959†	2,518	3,231	5,749	3.90
1959§	3,894	3,231	7,125	2.90
1960§	6,693	3,772	10,465	4.09
1961	5,460	4,143	9,603	3.44

* Estimated income for year.
† Does not include income from bonds held in temporary operating fund.
§ Includes income from bonds held in temporary operating fund.

REPORT OF THE FINANCE COMMITTEE

December 15, 1961

Executive Committee
American Economic Association
Evanston, Illinois

GENTLEMEN:

The accompanying tables show the list of the Association's investment holdings at the end of the fiscal year and changes made since the last report. Cost prices and approximate market values are shown in both alphabetical and classified lists. Bonds are listed according to maturity. The classified list shows government bonds, short term or cash equivalent and longer term fixed income securities, and stocks by industry groupings, domestic and foreign. Temporary operating funds, invested in U.S. Treasury bills and notes, represent Association working capital and foundation grants for specific purposes invested pending withdrawal to finance projects under way. Approximately $90,000 foundation money has been put to work in our investment portfolio.

A comparison of the results over the past year shows an increase of our investments, both in cost and at market, the increase in the market value being approximately $33,000 above the increase in cost (see Treasurer's Report for details). This figure should not be taken too literally, since it results from changes in holdings involving some addition of new money and also shifts of funds within the year. However, it does reflect benefits derived from management and favorable market conditions.

Income received from investment holdings, amounting to $7,901 in the classified table below, does not include some interest in temporary operating funds. Total income received from all holdings was $9,630.

A summary of sales, exchanges, and purchases of securities made during the year is shown in the accompanying table. Net profit in sales of securities amounted to $12,712, an amount approximately the same as that taken last year.

The proportions of stock and bond holdings are shown by class and by industry in the inventory and appraisal table below. It will be noted that the ratio of bonds and stocks to total amounted to 36.4 to 63.6, November 30, 1961, excluding the $60,000 U.S. securities in the temporary operating fund. The corresponding ratio November 30, 1960, was 43.3 to 56.7.

The members of this Committee are in frequent touch with each other and take occasion to hold formal meetings at least two or three times during the year, even more often when market conditions prompt an exchange of views.

Respectfully submitted,

C. WELLS FARNHAM, *Chairman*
CORLISS D. ANDERSON
JAMES WASHINGTON BELL

TABLE 1

LIST OF SECURITIES HELD BY THE ASSOCIATION

Stocks

Number of Shares of Stock	Issue	Cost	Approximate Market Value 11/30/61
100	Abbott Laboratories	$ 6,133	$ 7,300
150	American Potash and Chemical Corp.	6,284	9,000
104	Castle and Cooke	3,672	5,304
300	Central South West Corp.	2,101	13,800
150	Chain Belt Co.	6,621	6,600
50	Continental Illinois National Bank and Trust Co.	6,619	8,950
100	Deere and Co.	4,240	5,200
100	Farbenfabriken—Bayer AG	6,822	9,000
196	Gulf Oil Corp.	1,390	7,840
100	Houston Lighting and Power Co.	1,240	11,900
100	International Nickel Co. of Canada	3,911	7,900
100	McIntyre Porcupine Mines	4,818	5,100
150	Monsanto Chemical Co.	5,437	8,162
150	Montgomery Ward and Co.	5,013	4,650
100	Motorola	6,746	7,900
200	Olin Mathieson Chemical Corp.	8,731	8,000
200	Outboard Marine Corp.	3,827	4,200
220	Peoples Gas Light and Coke Co.	3,562	11,660
200	Raymond International	2,615	2,400
100	Siemens and Halske	5,519	9,400
150	Socony Mobil Oil Co.	3,882	7,200
100	Standard Oil Co. (Indiana)	3,650	5,100
121	Wells Fargo American Trust Co.	4,261	1 ,285
150	Zenith Radio Corp.	1,977	11,400
		$109,071	$188,251

Bonds

Par Amount	Issue	Cost	Approximate Market Value 11/30/61
$25,000	U.S. Treasury Bills, due 1/15/62	$ 24,424	$ 25,000
20,000	U.S. Treas. Notes, 4%, "D-1962," due 2/15/62.	20,003	20,000
35,000	U.S. Treas. Notes, 3¼%, "H-1962," due 11/15/62	35,000	35,000
20,000	U. S. Treas. Bonds, 2½%, due 8/15/63	20,091	19,600
5,000	U.S. Treas. Notes, 3¾%, "D-1964," due 5/15/64	5,000	5,000
8,000	U.S. Treas. Notes, 1½%, EO-1964, due 10/1/64.	8,000	7,760
50,000	U.S. Treas. Bonds, 3¾%, due 5/15/66	50,000	49,500
7,000	U.S. Treas. Bonds, 2½%, due 12/15/72–67	7,276	6,020
	Bonds	$169,794	$167,880
	Stocks	109,071	188,251
	Total	$278,865	$356,131

TABLE 2

INVENTORY AND APPRAISAL OF SECURITIES AND CASH AS OF NOVEMBER 30, 1961

	Par or Shares	Market Price	Market Value	% of Value	Approximate Income	Cost
CASH EQUIVALENT						
U.S. Treas. 4, 2/15/62	20M	100	$ 20,000		$ 800	$20,003
U.S. Treas. 2½, 8/15/63	20M	98	19,600		500	20,091
U.S. Treas. 1½, 10/1/64	8M	97	7,760		120	8,000
U.S. Treas. 3¾, 5/15/64	5M	100	5,000		175	5,000
			$ 52,360		$1,595	
BONDS						
U.S. Treas. 3¾, 5/15/66	50M	99	$ 49,500		$1,875	$50,000
U.S. Treas. 2½, 12/15/72-67	7M	86	6,020		175	7,276
			$ 55,520		$2,050	
Total fixed-income securities			$107,880	36.4	$3,645	
COMMON STOCKS						
UTILITIES						
Central & South West	300	46	$ 13,800		$ 278	$ 2,101
Houston Lighting & Power	100	119	11,900		160	1,240
Peoples Gas Light & Coke	220	53	11,660		330	3,562
			$ 37,360	19.8	$ 768	
FINANCIAL						
Continental Illinois National Bank	50	179	$ 8,950		$ 176	$ 6,619
Wells Fargo American Trust Bank	121	85	10,285		194	4,261
			$ 19,235	10.2	$ 370	
MERCHANDISING						
Montgomery Ward & Co.	150	31	$ 4,650	2.5	$ 150	$ 5,013
MACHINERY AND CONSTRUCTION						
Chain Belt	150	44	$ 6,600		$ 367	$ 6,621
Deere & Co.	100	52	5,200		200	4,240
Raymond International	200	12	2,400		—	2,615
			$ 14,200	7.5	$ 567	
MINING AND METALS						
International Nickel	100	79	$ 7,900		$ 150	$ 3,911
McIntyre Porcupine Mines	100	51	5,100		100	4,818
			$ 13,000	6.9	$ 250	
OIL AND GAS						
Gulf Oil	196	40	$ 7,840		$ 196	$ 1,390
Socony Mobil	150	48	7,200		300	3,882
Standard Oil of Indiana	100	51	5,100		190	3,650
			$ 20,140	10.7	$ 686	
CHEMICALS AND DRUGS						
Abbott Laboratories	100	73	$ 7,300		$ 190	$ 6,133
American Potash	150	60	9,000		180	6,284
Monsanto Chemical	154 3/10	53	8,162		154	5,437
Olin Mathieson	200	40	8,000		200	8,731
			$ 32,462	17.2	$ 724	
ELECTRICAL PRODUCTS						
Motorola	100	79	$ 7,900		$ 100	$ 6,746
Zenith Radio	150	76	11,400		127	1,977
			$ 19,300	10.2	$ 227	

TABLE 2—*Continued*

	Par or Shares	Market Price	Market Value	% of Value	Approximate Income	Cost
MISCELLANEOUS						
Castle & Cooke	104	51	$ 5,304		$ 104	$ 3,672
Outboard Marine	200	21	4,200		160	3,827
			$ 9,504	5.0	$ 264	
FOREIGN						
Bayer, A. G.	100	90	$ 9,000		$ 125	$ 6,822
Siemens & Halske	100	94	9,400		125	5,519
			$ 18,400	9.8	$ 250	
Total common stocks			$188,251	63.6	$4,256	
Total securities			$269,131	100.0	$7,901	$219,441
Temporary operating fund						
U.S. Treas. Bills 1/16/62	25M		$ 25,000			$ 24,424
U.S. Treas. Notes 3¼, 11/15/62	35M		35,000			35,000

TABLE 3

SUMMARY OF SECURITIES PURCHASED AND SOLD
YEAR ENDED NOVEMBER 30, 1961

		Cost	Proceeds	Profit or Loss*
Sales				
	Shares			
Stocks—				
Castle and Cooke	100	$ 3,528	$ 5,179	$ 1,651
Central and South West Corp.	100	700	4,105	3,404
Houston Lighting and Power Co.	31	384	2,895	2,511
International Nickel Co. of Canada	100	3,911	7,846	3,935
Monsanto Chemical Co.	65	2,356	3,514	1,158
Standard Oil of N.J.	1	39	44	5
Gulf Oil Corp.	.73	—	22	22
		$10,919	$23,605	$12,686
	Par Value			
Bonds—				
U.S. Certif. of Ind., 3⅛, 8/1/61	$ 5,000	$ 5,014	$ 5,002	Interest $12
U.S. Treas. Notes, 4¼, 11/15/62	10,000	10,000	10,026	Profit $26
		$15,014	$15,028	
Exchanged for other bonds— U.S. Certif. of Ind., 3⅛, 8/1/61	45,000	$45,124		Interest $124
Purchases				
	Shares			
Stocks—				
Montgomery Ward and Co.	150	$ 5,013		
McIntyre Porcupine Mines	100	4,818		
Olin Mathieson Chemical Corp.	200	8,731		
Outboard Marine Corp.	200	3,827		
Raymond International	200	2,615		
Monsanto Chemical Co.	.80	37		
Standard Oil of N. J. (as dividend from Standard Oil of Ind.)	1	39		
		$25,080		
	Par Value			
Bonds—				
U.S. Treas. Bills, 1/15/62	$25,000	$24,424		
Received in exchange of other bonds, U.S. Treas. Notes, 3¼, 11/15/62	$45,000	$45,000		

REPORT OF THE AUDITOR

December 18, 1961

Executive Committee
American Economic Association
Evanston, Illinois

DEAR SIRS:

In accordance with instructions we have examined the accounts and related records of the American Economic Association for the year ended November 30, 1961, and now submit our report thereon together with the following exhibits:

Statement of Financial Position—November 30, 1961	Exhibit 1
Statement of Income and Expense for Year Ended November 30, 1961	Exhibit 2
Special Funds—Year Ended November 30, 1961	Exhibit 3

Results from Operations

Net income for the year ended November 30, 1961, was $12,673 compared with net income of $26,616 for the year ended November 30, 1960, as shown in the following summary:

Particulars	Year Ended November 30 1961	1960	Increase Decrease*
Income:			
Dues	$ 61,980	$ 59,208	$ 2,772
Interest and dividends (net)	9,222	10,153	931*
Profit on sale of securities (net)	12,712	12,392	320
Miscellaneous income	816	154	662
Total income	$ 84,730	$ 81,907	$ 2,823
Expense:			
Publication expense	$ 80,506	$ 76,902	$ 3,604
Less—Publication income	52,903	48,515	4,388
Net publication expense	$ 27,603	$ 28,387	$ 784*
Administrative and other operating expenses	39,037	26,404	12,633
Appropriations	5,417	500	4,917
Total expense	$ 72,057	$ 55,291	$ 16,766
Net income	$ 12,673	$ 26,616	$ 13,943*

During the current year recording of dues and subscriptions was placed in the hands of a tabulating service. See below statement of auditors' responsibility regarding accuracy of prepaid dues and subscriptions which affects the income shown in the above tabulation.

Interest on bonds owned was accounted for in accordance with stated rates;

dividends received on stocks were compared with amounts reported in published records as dividends paid.

Net publication expense, as shown in the following summary, amounted to $27,603 for the current year compared with $28,387 for the preceding year:

Particulars	Year Ended November 30		Budgetary Estimates for
	1961	1960	Year 1961
Expenses:			
Printing of—			
Review	$ 41,123	$ 39,429	$ 45,200
Proceedings	19,759	18,915	21,000
Editor's honorarium	7,833	5,875	7,833
Payments to contributors	1,458	2,866	2,500
Editorial clerical salaries	9,635	9,292	9,767
Editorial supplies and expense	698	525	800
Total expenses	$ 80,506	$ 76,902	$ 87,100
Less—Income:			
Subscriptions, other than members	$ 24,610	$ 23,360	
Sales of copies	3,241	3,456	
Advertising	19,614	20,976	
Republications	5,438	723	
Total income	$ 52,903	$ 48,515	
Net publication expense	$ 27,603	$ 28,387	

Billings for the December, 1961, issue of the *Review* and reprints had not been made by the publishers at the time of our examination. The publishers estimate the cost of the *Review* printings and reprints at $11,850; this amount is included in the expenses for the year.

Financial Position

Financial position of the Association at November 30, 1961, and 1960 is set forth in the following summary:

Assets	November 30		Increase
	1961	1960	Decrease*
Cash on deposit and on hand	$ 13,469	$ 16,094	$ 2,625*
Receivables (net)	8,794	8,155	639
Advance to Foundation Project Chairman	2,300	2,300	—
Prepaid expenses	1,911	646	1,265
Equipment, furniture and fixtures (net)	1,729	2,168	439*
Investments at cost—			
Bonds	169,794	160,508	9,286
Stocks	109,071	94,910	14,161
	$307,068	$284,781	$ 22,287
Liabilities, Funds and Surplus			
Accounts payable	$ 13,116	$ 12,067	$ 1,049
Deferred income	13,767	12,803	964
Funds	94,524	89,023	5,501
Life memberships	16,300	14,100	2,200
Unappropriated surplus—			
Balance at beginning of year	156,788	129,072	27,716
Net income for year	12,673	26,616	13,943*
Life memberships transferred to surplus	100*	1,100	1,200*
Total	$307,068	$284,781	$ 22,287

Cash on deposit was satisfactorily reconciled with balances confirmed directly to us by the depositories.

The receivables of the Association were not confirmed by correspondence with debtors. Based upon the Association's past experience the reserve for doubtful accounts appears to be adequate to cover normal losses.

Changes in the investment account were verified by the examination of brokers invoices and other supporting data. Securities held at November 30, 1961, were confirmed directly to us by the State Bank and Trust Company of Evanston, Illinois, custodian for the Association, except for four securities purchased at end of year. For these we examined receipts, dated in December, received from the custodian when it received the certificates directly from the broker.

Funds

The receipts and expenditures during the year for the various funds and grants are detailed in Exhibit 3. Total funds available for specific projects increased to $94,523.88 at November 30, 1961.

Statement of Auditors' Responsibility

During the course of the examination we noted that the following balances could not be verified, for the reasons given hereunder:

(1) Fund for Economic Abstracts Committee has not furnished a report of expenditures during the year for this project.	$ 7,000.00
(2) Fund for survey study of economic text books in secondary schools Committee has not furnished a report of expenditures during the year from the $2,300 advanced to them out of this fund.	12,680.91
(3) Prepaid dues at November 30, 1961	3,715.48
(4) Prepaid subscriptions at November 30, 1961 The tabulating service has failed to furnish accurate lists of those members having prepaid dues or subscriptions at November 30, 1961, so these balances could not be verified. Our tests of the lists submitted by the tabulating service disclosed numerous inaccuracies therein and are therefore unsatisfactory for verifying amounts of prepaid dues and subscriptions at this date.	9,316.63

Although we do not express an opinion as to the financial statements, insofar as we were able to ascertain, other than those items above, all liabilities of the Association at November 30, 1961, are reflected in the accompanying statement of financial position, and the Secretary has represented to us that to the best of his knowledge all liabilities are disclosed except for those items noted above.

We express our appreciation for the courtesies and co-operation extended our representatives during the course of the examination.

Very truly yours,

DAVID HIMMELBLAU & CO.
Certified Public Accountants

EXHIBIT 1

AMERICAN ECONOMIC ASSOCIATION
STATEMENT OF FINANCIAL POSITION—NOVEMBER 30, 1961

Assets

CURRENT ASSETS:		
Cash on deposit and on hand—		
State Bank and Trust Company, Evanston	$ 9,375.41	
National Bank of Commerce of Chicago	4,033.21	
Petty cash	60.00	$ 13,468.62
Receivables—		
Review advertising	$ 4,866.75	
Accrued interest and dividends	1,178.43	
Publication sales, etc.	2,706.51	
Membership dues	165.00	
	$ 8,916.69	
Less—Reserve for doubtful accounts	122.19	8,794.50
Advances to Foundation Project Chairman (unexpended funds in hands of chairman of cumulative index project)		2,300.00
Inventory of stamps and envelopes		901.70
Unexpired insurance		409.19
Prepaid expense		600.00
Total current assets		$ 26,474.01
INVESTMENTS (at cost):		
Bonds (market value—$167,685.40)	$169,794.48	
Stocks (market value—$188,490.88)	109,070.73	278,865.21
EQUIPMENT, FURNITURE AND FIXTURES (less accumulated depreciation)		1,728.59
		$307,067.81

Liabilities, Funds and Surplus

CURRENT LIABILITIES:			
Accounts payable			$ 13,115.79
DEFERRED INCOME:			
Prepaid subscriptions		$ 9,316.63	
Prepaid dues		3,715.48	
Prepaid advertising		735.25	13,767.36
SPECIAL FUNDS (Exhibit 3)			94,523.88
LIFE MEMBERSHIPS AND SURPLUS:			
Life memberships		$ 16,300.00	
Unappropriated surplus—			
Balance November 30, 1960	$156,787.95		
Net income for year ended November 30, 1961 (Exhibit 2)	12,672.83		
Life memberships reinstated to surplus	100.00*	169,360.78	185,660.78
			$307,067.81

* Denotes red.

EXHIBIT 2

American Economic Association
Statement of Income and Expense
for the Year Ended November 30, 1961

Particulars	*Amount*			
INCOME:				
Dues—				
Regular junior and family members			$57,516.35	
Subscribing and contributing members			4,463.50	$61,979.85
Investments—				
Interest on bonds			$ 5,460.01	
Dividends			4,142.65	
			$ 9,602.66	
Less custodian fees			381.08	9,221.58
Gain on sale of securities				12,712.00
Miscellaneous income				816.13
Total income				$84,729.56
EXPENSE:				
Administrative and other expense—				
Secretary's salary		$ 7,833.32		
Office salaries		22,764.23		
Addressing service income less expense		6,338.42*		
Accounting service (IBM service)		6,000.00		
Postage		1,925.87		
Stationery and printing		1,762.69		
Insurance		169.06		
Executive committee expense		1,802.78		
Other committee expense		827.14		
Annual meeting income less expense		2,591.83*		
Annuity payments		1,019.19		
Social security taxes		854.32		
Provision for depreciation		862.40		
Telephone and telegraph		306.58		
International Economic Association		400.00		
Office supplies		369.26		
Miscellaneous expense (net)		1,070.72	$39,037.31	
Publication expense—				
Printing of—				
Review		$41,122.58		
Proceedings		19,759.31		
Editorial honorarium		7,833.32		
Payments to contributors		1,458.24		
Editorial clerical salaries		9,634.78		
Editorial supplies and expense		697.58		
		$80,505.81		
Less—Publication income:				
Subscriptions other than members	$24,609.75			
Sales of copies	3,240.96			
Advertising	19,613.76			
Republications	5,438.72	52,903.19	27,602.62	66,639.93
				$18,089.63
LESS—Expenditures to November 30, 1961 on Cumulative Index Project (applicable to $9,000 appropriated therefor)				5,416.80
Net income for year (Exhibit 1)				$12,672.83

* Denotes red.

EXHIBIT 3

American Economic Association
Statement of Special Funds
for the Year Ended November 30, 1961

Fund	Balance November 30, 1960	Received	Expended	Balance November 30, 1961
Carnegie Corporation of New York grant for travel expenses of delegates to international meetings....	$ 2,538.64	$ —	$ 300.00	$ 2,238.64
Rockefeller Foundation grant for survey articles on recent developments	4,375.00	1,725.00	2,900.00	3,200.00
The Ford Foundation grants—				
Preparation of a special register of economists....................	1,835.50	—	—	1,835.50
Translation of books and articles of major significance into the English language..................	25,000.00	—	—	25,000.00
Preparation and publication of articles surveying economic research in foreign countries............	39,085.07	—	—	39,085.07
Survey study of economic textbooks in secondary schools......	12,680.91	—	—	12,680.91
Fund for Economic Abstracts.....	—	7,000.00	—	7,000.00
Committee on Economic Education..	107.80	—	—	107.80
Committee on Papers and Proceedings	250.00	—	—	250.00
Committee on Professional Standards and Ethics......................	500.00	—	—	500.00
Asia Foundation	1,242.79	2,500.00	1,581.00	2,161.79
Committee on Publications and Research..........................	353.17	—	—	353.17
Sundry..........................	123.00	—	12.00	111.00
Total funds (Exhibit 1)......	$88,091.88	$11,225.00	$ 4,793.00	$94,523.88
The Ford Foundation grant for preparation of a cumulative index of economic journals..................	931.02	—	6,347.82	
Excess of expenditures over fund balance covered by Association appropriation (Exhibit 2).....	$89,022.90	$11,225.00	$11,140.82	$ 5,416.80

REPORT OF THE MANAGING EDITOR FOR THE YEAR ENDING DECEMBER 1961

The number of manuscripts received during 1961 was the highest on record —305 as compared with 190 in 1952, the first year in which I served as Managing Editor of the *Review*. Table 1 gives comparative figures for the past six years.

TABLE 1

MANUSCRIPTS SUBMITTED 1956–61

	1961	1960	1959	1958	1957	1956
Manuscripts received	305	276	279	242	215	242
Articles	179	158	180	151	141	153
Communications	126	118	99	91	74	89
Percentage of articles accepted	12	16	14	17	19	18

Table 2 provides the breakdown of the volume's contents between articles, review articles, communications, book reviews, etc. The allocation of space between these various sections of the *Review* has remained about the same as in recent years. One survey article, financed by the grant from the Rockefeller Foundation, was included in the volume—the third in the series of eight that has been planned.

TABLE 2

SUMMARY OF CONTENTS, 1959–61

	1961		1960		1959	
	Number	Pages	Number	Pages	Number	Pages
Leading articles	20	441	22	478	20	408
Review articles	2	32	3	67	5	74
Communications:						
Original	10	66	9	49	7	46
Comments and replies	15	48	14	36	16	94
Book reviews	210	377	196	342	205	345
Classified lists:						
New books	—	70	—	62	—	63
Periodical articles	—	60	—	61	—	69
Dissertations	—	41	—	28	—	30
Notes	—	33	—	42	—	42
		1,168		1,165*		1,171*

* Plus some blank pages.

A fourth survey article is in press and will appear in the March 1962 issue. Three others are scheduled for completion in the coming year.

Table 3 summarizes the subject-matter distribution of articles, review articles, and communications for the past five years; the figures in parentheses give the distribution for 1961 only. The most interesting figures are those for leading articles plus original communications, since to some extent these figures indicate the areas in which the most work of publishable quality and of broad interest to economists is being done. The six fields showing the highest concentration for the last five years are as follows: Economic Development (32), Price and Allocation Theory (27), Income and Employment Theory (27), Public Finance (21), International Economics (20), and Money and Banking (16).

TABLE 3

SUBJECT-MATTER DISTRIBUTION: ARTICLES AND COMMUNICATIONS, 1957–61 AND 1961*

	Articles	Review Articles	Original Communications	Comments: Replies	Totals
General economics	5	2	3 (1)	3 (3)	13 (4)
Price theory	16 (3)	2 (1)	2	7 (2)	27 (6)
Income theory	13 (2)	2	3 (1)	9 (1)	27 (4)
History economic thought	4 (1)	—	1	2	7 (1)
Economic development	13 (1)	1	4 (2)	14 (1)	32 (4)
Social accounting	3 (1)	1	1	—	5 (1)
Economic systems	3	2	—	—	5
Business fluctuations	6 (1)	1	1	2	10 (1)
Money and banking	5 (2)	3 (1)	4 (1)	4 (2)	16 (6)
Public finance	5	1	7	8 (4)	21 (4)
International economics	13 (3)	2	3 (2)	2	20 (5)
Business finance	3 (1)	—	—	3	6 (1)
Business organization	2	—	—	—	2
Industrial organization	5 (1)	1	3 (1)	4	13 (2)
Land economics	3 (1)	1	1	—	5 (1)
Labor economics	3 (1)	—	1	2	6 (1)
Population; welfare	4 (2)	—	1 (1)	2 (2)	7 (5)
Unclassified	1	—	4 (1)	1	6 (1)
	107 (20)	19 (2)	39 (10)	63 (15)	228 (47)

* The 1957–61 figure is followed in each case by the 1961 figure in parentheses.

Table 4 presents the expenditures in 1961 for the four regular issues of the *Review* in comparison with the estimated budget and with the actual expenditures in 1960. The budget figure for 1961 did not include the estimated expense of publishing one survey article, but the actual expenditure figure for the year does include this expense—approximately covered by an allocation of $1,675 from the Rockefeller Foundation grant. The budget figure for 1961 also did not include the increase in the salary of the Managing Editor, which is included in the actual expenditure figure for the year. These two items more than adequately explain the discrepancy between the budget figure and the actual expenditure figure for 1961.

TABLE 4

ACTUAL AND BUDGETED EXPENDITURES

	Budget 1961	Actual 1961	Actual 1960
Printing and mailing	$45,200	$43,791.33	$39,583.58*
Editor's salary	6,000	8,000.00	6,000.00
Editorial assistance	9,300	9,750.79	9,006.52
Supplies	800	901.25	634.44
Contributors	2,500	2,921.90	2,918.25
	$63,800	$65,365.27	$58,142.79

* Corrected from 1960 report.

Table 5 gives detailed information about printing cost by issues. The number of copies printed in 1960 averaged 15,000; in 1959, 14,125; in 1958, 12,975; in 1957, 12,400. The successive increases are of course mainly related to the increases in membership and subscriptions.

TABLE 5

COPIES PRINTED, SIZE, AND COST OF PRINTING, 1961

	Copies Printed	PAGES		Issue	Reprints	Cost Including Reprints
		Net	Gross			
March	15,800	273	336	$10,720.95	$188.83	$10,909.78
June	15,600	257	304	9,266.13	99.90	9,366.03
September	15,600	335	384	11,548.99	116.53	11,665.52
December	15,600	303	376	11,750.00†	100.00†	11,850.00
		1,171*	1,400	$43,286.07	$505.26	$43,791.33

* Includes 3 blank pages.
† Estimated.

The estimated costs for the coming year are presented in Table 6, based on a volume of 1,420 pages, including advertising (or about 1,150 pages of text, exclusive of survey articles) and an average number of copies of 16,500. Anticipated cost of survey articles is not included, since this cost will be substantially covered by the Rockefeller Foundation grant.

TABLE 6

RECOMMENDED BUDGET FOR 1962

Printing (including paper, postage, reprints, etc.)	$46,700
Editor's salary	8,000
Editorial assistance	9,750
Supplies	900
Contributors	2,500
	$67,850

During the year I have had the advice and assistance of the following foreign correspondents—who have been particularly helpful with regard to the selection of foreign books for listing and review:

Isaac Kerstenetzky (Brazil)
Maurice Flamant (France)
Erich Schneider (Germany)
Oscar Soberón (Mexico)
P. J. Verdoorn (Netherlands)
Bent Hansen (Sweden)
Paolo Sylos Labini (Italy)

Three members of the Board of Editors complete their three-year terms of office at this time: Rendigs Fels, A. C. Harberger, and W. F. Stolper. I wish to express appreciation of the generous expenditure of time they have made in the interests of the *Review* and the Association. I nominate for three-year terms beginning in 1962: Martin Bronfenbrenner, A. O. Hirschman, and Roland McKean.

During the year I have frequently sought the aid of members of the profession in addition to the members of the Editorial Board—partly to relieve the latter of what would otherwise be an impossibly heavy burden and partly to obtain advice of specialists in particular areas not represented on the Board. The following have assisted in this way:

M. Abramovitz
A. A. Alchian
E. Ames
K. Arrow
J. S. Bain
G. S. Becker
A. Bergson
S. T. Beza
O. H. Brownlee
R. W. Campbell
A. M. Cartter
R. E. Caves
H. S. Chenery
C. Christ
R. M. Cyert
D. Dewey
E. D. Domar
D. Durand
R. A. Easterlin
R. Eckaus
O. Eckstein
R. Eisner
G. A. Elliott
H. S. Ellis
M. Frankel
M. Gideonse
R. Goode
R. A. Gordon
F. M. Gottheil
J. G. Gurley
M. Hastay
G. H. Hildebrand
A. O. Hirschman
J. Hirshleifer
E. M. Hoover
H. S. Houthakker
G. Jaszi
D. G. Johnson
N. Kaplan
D. L. Kemmerer
I. Kravis
H. B. Lary
S. Lebergott
A. P. Lerner
J. Letiche
J. P. Lewis
C. E. Lindblom
J. Lintner
A. Lowe
S. J. Maisel
J. W. Markham
J. R. Meyer
R. F. Mikesell
H. P. Minsky
E. J. Mishan
J. N. Morgan
L. N. Moses
W. F. Mueller
E. Neuberger
G. Patterson
S. Peterson
F. Pierson
M. G. Reid
Romney Robinson
J. Rothenberg
W. S. Salant
T. C. Schelling
J. Schmookler
V. E. Smith
W. L. Smith
J. J. Spengler
P. O. Steiner
R. Summers
P. M. Sweezy
L. Tarshis
R. B. Vance
W. S. Vickrey
R. Vining
F. V. Waugh
J. F. Weston

Respectfully submitted
B. F. HALEY, *Managing Editor*

REPORT OF THE COMMITTEE ON RESEARCH AND PUBLICATIONS

The most tangible result of the work of the Committee on Research and Publications during the last year has been the appearance of volumes in the Cumulative Index Project.

Arrangements are being made for two additional sets of readings to be sponsored by the Association. One is a volume of *Readings in Welfare Economics,* to be edited by Kenneth Arrow and Tibor Scitovsky. The second is a new *Readings in Business Cycles,* to be edited by R. A. Gordon and Lawrence Klein. It is hoped that final arrangements with the proposed editors can be concluded shortly. In this connection, the financial arrangements connected with the *Readings* volumes were reviewed, and recommendations were made to the Executive Committee to enlarge the funds available for each such project.

While various other projects have been considered by the Committee, no action has been taken which can be reported at this time.

WILLARD L. THORP, *Acting Chairman*

CUMULATIVE INDEX PROJECT

Present Status of Publication. Since the meeting a year ago, three of the five volumes have been published. The last of the proof on the fourth volume was received December 19, 1961; publication is expected in early February.

All the manuscript on the fourth and fifth volumes has been ready for Irwin since late April. Despite my frequent urging, Irwin has been unable to speed up publication. However, the fifth volume should be out by late April or early May.

Financial Status. A copy of a financial statement was submitted in August last. The estimates of cost to complete the project seem quite accurate based on expenditures since then in connection with proof on Volumes III and IV. We have spent since July 15, $563 out of a total of $1,238 estimated additional expenses (excluding publication subsidy).

Future Plans. As I indicated in my earlier report, I have received many inquiries about plans to carry the project on beyond the terminal date of 1959. This should, I believe, be considered in connection with plans concerning the proposed abstract of articles.

As a first step I would suggest consideration of publishing a sixth volume of the *Index* covering the three years 1960-62, using the present classification system and format and approximately the present coverage. If a decision were made early enough to plan for staff, this could be completed and published by December, 1963. Thereafter, the project might be carried on by a volume every two or three years, or an annual volume published as a supplement to the *AER*. To do a good job will not be inexpensive and cannot be done by casual labor. Whatever the final decision, if the project is to be carried forward, careful attention must be given to (1) adequate financing and (2) provision of competent and continuing personnel.

JOHN PERRY MILLER

REPORT OF THE COMMITTEE ON ECONOMIC EDUCATION

The several members of the Committee have been engaged during the past year in a wide range of activities related to the interest of the Committee in the teaching of economics both at the college and secondary level, but the formal activities of the Committee have been limited to planning the program for the session on economic education at the annual meeting, and to approving co-operative sponsorship of actions undertaken by the Joint Council on Economic Education.

Two Committee projects are still in process. The publication of the textbook report for which the Committee is responsible has been delayed by forces beyond the control of the Committee, but this project will be brought to a head during the coming year. The forthcoming publication by the American Council of Learned Societies of a group of position papers by representatives of the several social sciences on the content objectives of the social studies in the schools (including a paper on economics) represents the culmination of one part of a broad program initiated some time ago by the Committee.

With the several projects now being undertaken in the area of economics in the schools by the Joint Council on Economic Education, the National Task Force on Economic Education, the National Council on Social Studies and the ACLS, the Committee is concerned to ascertain the precise points at which its active interest and participation can be most useful. It earnestly solicits suggestions from members of the Association; and it expects in the near future to develop and carry out a further positive program.

BEN W. LEWIS, *Chairman*

December 26, 1961

NATIONAL TASK FORCE ON ECONOMIC EDUCATION

Executive Committee
American Economic Association
Evanston, Illinois

GENTLEMEN:

The National Task Force on Economic Education, appointed by the President of the AEA in early 1960, has completed its work. Its report, *Economic Education in the Schools,* was published about four months ago. A summary volume under the same title was also published. Copies of both can be obtained from the Committee for Economic Development, and the Task Force hopes that those members of the profession who are interested in secondary school education in economics will find the Report valuable.

At the request of the Executive Committee of the AEA, the Task Force members will continue to serve through 1962-63 as an Advisory Council to the nationwide TV program, "The American Economy," which tentatively is scheduled to appear on CBS "College of the Air" through 1962-63. This program, for which Professor John R. Coleman, of Carnegie Institute of Technology, is to be the primary teacher, will be intended especially for high school social studies teachers who are responsible for teaching economics, as well as for the general public. Both the American Economic Association and the National Task Force on Economic Education have agreed to serve as cosponsors of the program if it appears.

Respectfully submitted,
G. L. BACH, *Chairman*

REPORT OF THE COMMITTEE ON PAPERS AND PROCEEDINGS

I. *Introduction*

The Committee on *Papers and Proceedings* was appointed in 1959 by President Burns as an *ad hoc* committee to consider the future of the *Papers and Proceedings* volume, which has been published annually by the Association. The appointment of the Committee followed upon the report made in December, 1958, by the Committee on Association Deficit, which called attention to the cost of publishing the papers and proceedings volume, referred to criticisms of the quality of material presented in it and suggested consideration of not publishing the volume, and if publication continued, of a number of possible alternatives for reducing the cost.[1]

No time limit was placed upon the work of the Committee on *Papers and Proceedings*. A preliminary oral report was presented to the Executive Committee in December, 1959.[2]

Our Committee believes it is a healthy practice for an organization to bring under periodic review its institutions and activities. We share the view that it is important to explore all criticisms and to analyze alternative courses of action. However, we have approached our consideration of the papers and proceedings volume with no presumption either for or against change. No state of affairs is ever wholly satisfactory. The problem is one of achieving the optimum result on balance.

Suggestions for changes with respect to the papers and proceedings volume that have come to our attention for consideration, including those made by the Committee on Association Deficit, range from abandoning the volume to increasing its coverage and size, and include a variety of proposals intended to reduce the cost, improve the quality, or both. Obviously there are mutual contradictions among these suggested alternatives. In a democratic organization it is desirable that the values of the membership as a whole should control. We have not, however, made any effort to secure the considered opinion of the whole membership or a significant sample of it.

The matter did not seem to the Committee to warrant such action. Moreover, it may be doubted whether the results of such a poll would reflect careful judgments based on full information rather than offhand snap judgments that might be reversed on more careful consideration. We have, however, been in touch orally and by correspondence with some fifty members of the Association from whom we believe we have received well-considered opinions. This is not viewed by us as necessarily reflecting the weight of opinion but it has been useful in bringing out proposals, arguments, and points of view which the Committee has taken into account in this report.

On one point the views both of the Committee and of the persons consulted were virtually unanimous; namely, that the papers and proceedings volume should continue to be published. On whether and how it should be changed there were wide divergences of views.

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[1] *A.E.A.Papers and Proceedings*, May, 1959, p. 652.

[2] *Ibid.*, May, 1960, p. 670.

Our Committee has the impression, perhaps without justification, that some of the criticisms of the papers and proceedings volume reflect at bottom a degree of dissatisfaction with the program of the annual meeting and perhaps even with the present state of the field of economics. While these are fundamental matters and have a vital bearing on the papers and proceedings volume, we think they involve separate questions and we have not considered them. We have proceeded on the assumption that the prevailing type of program will be continued at the annual meetings. This is an assumption of considerable importance to our report. A substantial increase in the number of sessions, a shift to the panel discussion type of session, or placing heavy emphasis on mathematical economics or on reports of factual research projects, each in its different way would affect the nature of the problem of the papers and proceedings volume and the appropriate choice among alternatives with respect to it. We have assumed, moreover, that the papers and proceedings volume has not been an obstacle to the program committee in arranging precisely the type of program which it desired to have presented, although this may well be in some degree an overoptimistic assumption.

II. *Practices of Other Associations*

One of the arguments that has been made against publishing the papers and proceedings volume is that many other organizations do not publish such a volume. This fact presents a good reason to review our practice in the matter but gives no presumption with respect to the proper conclusion. Our Association may be doing a better job than those that do not publish such a volume, or their circumstances may be significantly different.

In order to secure information on the practices of other associations, permission was received to examine the replies to a questionnaire distributed by the Science Information Service of the National Science Foundation to organizations which it classified in the social science category. Information of rather limited scope was secured for some twenty organizations. Approximately one-third of the organizations replied that they published all or part of the papers presented at the annual meetings. It may be of interest to note that the American Economic Association has by far the largest membership of the reporting organizations, with the exception of the American Psychological Society, which has a number of different divisions, charges much higher dues, and has no papers and proceedings volume although some of the papers are published in its journals.

To develop further information regarding the practices of other organizations the Committee distributed a questionnaire to about twenty associations which were thought to have publication problems similar to those of the American Economic Association. In a few cases these organizations were also included in the information secured from the National Science Foundation. The Committee wishes to express its appreciation to the association officials who generously co-operated in supplying information, and to the Foundation.

The practices reported for these organizations showed great variation. Of the fifteen organizations that responded to our inquiry, four published the papers of their meetings in a manner comparable to our papers and proceedings volume while eleven did not. One additional association had authorized the publication of such a volume and was at the time working on the editorial details. Four associations reported that they had formerly published a proceedings volume but had abandoned it. In one case the reason for abandonment was the expense resulting from the expansion of the number of papers. In another case the establishment of a journal by the organization absorbed so many of the papers that in effect it killed off the proceedings volume.

Some of the respondents expressed satisfaction with the use of abstracts and doubted both the need and desirability of publishing papers in full. On the other hand, officials responding for one or two other associations recognized the existence of problems that might be solved by a proceedings volume. A respondent from an association publishing a proceedings volume wrote: "It seems to me that meetings and proceedings are almost joint products."

Unlike the American Economic Association, the professional associations for political science and sociology do not publish papers and proceedings volumes. In evaluating the significance of this fact for us, it should be noted that economics differs in at least one major respect from other social sciences, in that economics has long had a central core of theory that explains all economic activity as being related interdependently in a seamless structure. Economists are vigorously engaged in criticizing and modifying the body of theory, but with rare exceptions they adhere to the concept that a unified body of theory holds a central position even in applied and political aspects of economics. It is undoubtedly for this reason that the program committees of the Association have been able to resist the pressures for the proliferation of sessions which are brought to bear by devotees of newly developed branches of the discipline—pressures which in the associations of some other social sciences have resulted in such a large number of sessions that it is impracticable to report them in full in a papers and proceedings volume. Groups with special interests which are peripheral to the central concerns of economics have been formed and meet in conjunction with the Association and sometimes share sessions with it but have not destroyed the basic unity of the Association's approach to economics.

III. *Functions Performed by the Papers and Proceedings Volume*

At this point we wish to review briefly the main functions which we believe are performed by a papers and proceedings volume.

1. The annual meeting continues to be the occasion for presenting new ideas, re-examining old ones, exploring interdisciplinary relations, emphasizing public policy implications, and in general giving a fair picture of the field of economics. Undoubtedly the annual meeting is the major factor operating to give members the sense of being a part of a great going concern with a distinct identity. The papers and proceedings volume reinforces this effect of the meeting, continues it over the whole year, and extends it to all members whether or not they were able to be present in person at the meeting.

2. Most members of the Association do not attend every annual meeting

and those who are in attendance cannot possibly attend all sessions. The papers and proceedings volume enables all members, present or absent, to share in the benefits of all sessions.

3. The prospect of publication stimulates participants on the program to prepare their papers with greater care. The prospect of publication is also a protection against frustration for the member who, after lengthy preparation, not infrequently is faced with an audience of no more than a score of persons because of the competition of other sessions or of outside distractions. Moreover, the invited papers on the program result in some contributions that otherwise might be lost entirely.

4. In view of the character of the program at the annual meeting, the papers and proceedings volume gives a better picture of the stage of economic thinking and its evolution over the years than is available in any other source. While not every important topic is touched on each year, virtually all topics that are considered important are re-examined every few years.

5. The volume is looked on as a valuable source of information in economics. Its usefulness is recognized by members whose time is taken up with their own specialties but who sense the need to keep informed about progress in other fields. The volume also provides an element of economic education for writers and other publicists. Members make substantial use of the volume in their own study and research. Of the thirty-eight economists who submitted their views to the Committee in writing, eighteen reported using the volume "frequently" in their personal study and research, and the remainder reported using it "occasionally"; none reported using it "virtually never." The volume also is used in teaching. Of the thirty-eight previously mentioned, nine reported using the volume frequently for teaching assignments, twenty-two occasionally, and five virtually never. A rather frequent comment was that the articles in the papers and proceedings volume were superior for teaching assignments to those appearing in the *American Economic Review* and other journals. This view of course was by no means unanimous.

IV. *The Quality of the Papers*

In its report, the Committee on the Association Deficit stated that "the *Papers and Proceedings* have been criticized because of the wide variations in the quality of the material printed. . . ." We agree that this is a valid criticism and we further agree that the variation in quality "is attributable to the attempt to make the volume as complete a record of the annual meeting as is feasible and to publish it promptly." In consulting with other economists we found general recognition of the variation in quality, but a wide range of opinion regarding how large a proportion of papers is of low quality and how the average quality and usefulness compare with those of articles appearing in the economic journals, including the *American Economic Review*. With respect to this latter comparison, the descriptive terms applied by economists included among others "quality far below," "poor quality," "lower," "somewhat lower in quality," "seldom up to quality," "a shade below," "no marked difference," "it depends," "equally useful," "rather well," "uneven but on the whole comparable," "compares favorably," "better because more general and less devotion to mathematics," "coverage often more useful," "more useful."

Those economists who expressed approval of the *Papers and Proceedings* were attracted by several aspects. The "coverage is more useful for getting a bird's-eye view." The presentation in more qualitative terms than in the journals "is probably a great help to many in the profession." The "broad coverage" is valuable. It is "useful to have several papers on a common subject for assignment." The papers which "bring the reader to the frontiers of fields in which he rarely works but wants to be informed serve a purpose even though they break no new ground." There are "more new ideas expressed"—although this is matched by the charge that "few of them develop new ideas." Economists have never had a reputation for unanimity of opinion.

In giving a general appraisal of the *Papers and Proceedings*, of the thirty-seven who supplied written comments, more than a quarter (twelve) expressed themselves as being "satisfied"; only five expressed themselves as "moderately dissatisfied" or "very dissatisfied"; the remainder reported that they were "fairly well satisfied." We warn again that these figures throw little light on the question of what fractions of the whole membership hold these different views.

Some critics would overlook the inequalities in papers as being inevitable in view of the variety of considerations that go into the making of the program of the annual meeting. Others emphasized the hope that the quality can be improved. Since the papers and proceedings volume grows out of the program, it cannot be expected to rise above the level of performance, although by cutting out what seems to some person or persons inferior material the average level of the volume can be raised.

While a considerable number of the respondents expressed no concern about the present size of the volume and one favored enlarging it, the more general reaction was that the volume can and should be reduced in size, mostly for financial reasons, but, in the view of some, also because the length of the volume and of the papers it contains repel the reader. The problems and methods of reducing the size of the volume and raising its quality are discussed in a later section of this report.

V. *Financial Aspects*

Perhaps the major source of concern with the papers and proceedings volume has been the cost of publication. In 1960 (1959 meeting) the publication cost was $18,914, 92 per cent higher than ten years earlier, in 1950 (1949 meeting), when the cost was $9,864. The number of copies increased from 10,100 to 14,800, or 47 per cent, and the cost per copy from $0.98 to $1.28, or 31 per cent. Moreover, the number of pages rose from 650 to 745, so that the per copy cost per page rose from $0.0015 to $0.0017, or 14 per cent. Despite the increases in cost, $1.28 for 745 pages or $0.0017 per page will be recognized as modest, to put it mildly.

The publication costs referred to above do not include the editing costs, which are perhaps largely indeterminate since the editing burden has been borne as part of the work load of the Secretary's Office.

The abandonment of the papers and proceedings volume would not save the entire cost of publishing that volume. Clearly the *American Economic Review* would have to be increased in size or some provision made for publication in other ways of a substantial fraction of the papers and of the business proceedings.

As previously stated, the Committee and the persons consulted are virtually unanimous in the belief that the papers and proceedings volume should continue to be published. Some very strong statements were made to the Committee by persons who vigorously oppose abandonment. A more moderate statement was: "An organization with the history and prestige of the American Economic Association should take this course only for good reasons which do not now exist."

The overwhelming sentiment of those consulted was that it would be better, if it became necessary, to increase the dues by the amount involved and distribute the papers and proceedings volume to all members than to charge separately for the volume or to eliminate it. This is the view also of the members of the Committee, except for one member, who would prefer to charge separately for the volume, partly to permit some separate expression of membership judgment of its value.

It is probable that if a separate charge were made for the papers and proceedings volume, the average cost per copy would be higher than now since inevitably some members either through inertia or lack of interest in the publications of the Association would not buy the volume. Administrative problems would arise in estimating the numbers to be printed and in distributing the volume which are avoided under the present arrangement.

A considerable number of those persons consulted who favored distribution of the papers and proceedings to all members, even if an increase in dues were required, also expressed hope that some economy could be achieved. The two possible sources of economy in publication costs that have occurred to us are to reduce the size of the volume, which was the usual source suggested, and to use an offset printing process from typed manuscript. We do not look upon the latter as a promising solution in view of the large number of copies published. A minor shortening of the volume could promise only small savings per member, in the light of the financial information presented above. The question of reducing the size of the volume is considered in the next section.

VI. *Possible Methods of Shortening and Improving the Volume*

In view of the modest cost figures per copy and per page we believe that quality and usefulness to the membership are more important than saving money on the papers and proceedings volume. How can the volume be held to a reasonable size and its quality improved while maintaining the characteristics that make it valuable to the membership, of which promptness of issue is by no means the least?

Two approaches to reducing the size of the volume are to reduce the number of papers and discussions reported, and to shorten their average length.

Both methods might be employed in the volume in respect to different sessions and papers. Several proposals involving these approaches merit examination.

Editorial Evaluation after the Meeting. A proposal made by a number of persons is that an editorial board should be established to evaluate the papers and discussions, weed out trivial and weak items, and decide on appropriate lengths for those that are approved for publication. This is a very attractive proposal, since it would seem to solve the problems of both size and quality. However, as some members who have faced editorial responsibilities have pointed out, the task would be a difficult one to perform equitably. The range of subjects treated is broad, each of us tends to evaluate material in relation to his own standards of rightness and importance, and it would be difficult to avoid a double standard in dealing with presentations of well-known and unknown participants.

It would take a highly qualified board of editors to achieve these goals and especially to have the prestige required to minimize the inevitable criticisms by persons who considered themselves to be unjustly treated. The difficulties of recruiting a group of editors of the required competence, prestige, and range of interests, who also are willing to take the time necessary to do the work involved, in the midst of other pressures, may readily be visualized. Assuming it proved feasible to appoint such a board of editors, it seems inevitable that several months would be required in the editorial process. The membership would have to be prepared to wait for the issuance of the papers and proceedings volume perhaps until shortly before the next annual meeting. A busy man cannot be expected to drop everything else and do this editorial task as a first order of business, unless he is financially well compensated for the task, which would not be consistent with the objective of saving expense. A delay in the publication of the papers and proceedings volume would greatly reduce its value; among proposals received by our Committee was the speeding up of publication. Accordingly, we are pushed to the conclusion that the proposal for editorial choice after the papers are read is not desirable as a general method of dealing with the problem.

Selection When the Program Is Developed. Another proposal is that the program committee decide in advance which sessions and papers would be reported in the papers and proceedings volume. It is our understanding that this method has been used in recent years with respect to certain sessions not originally planned but arranged in response to the demands of particular groups. This method would seem to be particularly appropriate where the subjects to be discussed were peripheral or of limited general interest. We think there is a reasonable possibility of extending the use of this technique to other papers. We quote from a letter received from an economist not engaged primarily in teaching:

> There are really three types of papers which unduly inflate the volume of the public proceedings. First, papers of low quality or limited interest, the editorial committee could easily weed out. Second, preliminary reports on research projects or "previews" of books to be published shortly. In this case, the condensed version or the selected material published in the proceedings becomes very rapidly superseded since subsequent references in research

> and teaching are usually made to the full report or the book of the paper's author. Finally, there are progress reports and preliminary statements based on research in progress which again are of little permanent value and also rapidly become superseded.

While undoubtedly there are differences of opinion about these and other categories of papers, we believe that the direction indicated is a practical one toward which to work. We believe the decisions to publish or not to publish should be made at the time the program is developed and not after the papers are presented. In this way no expectations are destroyed and there is no basis for an acute sense of injustice. Also, the issuance of the volume would not be delayed. It should be feasible for the program committee to identify the types of papers it thinks deserve to be in the permanent record. Any elimination at all will of course reduce the value of the volume to some members, but if provision is made for publishing abstracts of such papers—a proposal which will be discussed below—and perhaps for making available the completed papers in mimeographed form, this kind of loss could be kept to a minimum.

Limitations on the Length of Papers. A third method of dealing with the problems of size and quality is to enforce more rigid limits on the length of individual papers. Some persons have suggested shortening the record of business meetings and the committee reports. Clearly these proceedings should be kept as short as an economical use of words permits, but we believe the membership should have available to it a reasonably full account of the actions taken at the business meetings of the Association and of the Executive Committee. Therefore, our concern here is with the papers and discussions.

Most papers doubtless are longer than they need to be to present the basic ideas together with the analysis and documentation necessary to develop those ideas. Written papers usually can be briefer than oral presentations, and the academic profession is not noted for economy in the use of words. As one economist wrote, "Some of the brethren verge upon being long-winded"; this is perhaps an understatement. One problem of the meetings has been that the paper written is often far longer than can be presented in the time at the disposal of the author at the meeting itself. We believe this is bad practice. The participant is invited to present a paper at the meetings; to use this presentation as the occasion for publishing a much longer paper is to extend the functions of the papers and proceedings volume beyond those involved in reporting the meetings. It is often necessary to report less than is said at a meeting; it is an anomaly to report more than is said.

In general the paper that is read should be the paper that is published. There is merit in requiring the final paper to be in the hands of the editor at the time of reading. Whether or not this requirement is made, a reasonable standard of length would be the number of words that can comfortably be read in the time limits imposed when the program was planned. It may be that for one reason or another some papers will need to be longer than this standard. The chairman of the session might be looked to for advice and consultation with the writer of the paper when a question of this kind arose.

We see merit in having the program committee constitute an appeals body to which the editor of the papers and proceedings volume might turn for guidance and the author of the paper might appeal for an additional number of words.

Abstracts. A few persons consulted recommended the use of abstracts. One or two suggested that all papers be abstracted in the papers and proceedings volume, with the understanding that the papers also could be submitted in the usual manner to the *American Economic Review* and other journals. Several other respondents favored abstracting only the less important material presented and publication in full of the major papers. Against these views may be contrasted others, such as "definitely do not abstract—this would make the volume worthless," "no abstracting—this would kill it for me," and "brief abstracts are almost useless."

The abstracting method is used very largely by the natural science associations and to some extent by social science associations. For example, the American Sociological Association in advance of the annual meeting publishes abstracts of the papers to be presented. These abstracts are limited to three hundred words each. Some other associations have comparable arrangements. We believe the usefulness of abstracts for our papers and proceedings volume depends on the type of paper or discussion. An abstract may be very useful in summarizing a scientific experiment or other piece of research in which the important questions are the methods used and the results. Most of the papers presented at our Association meetings, and certainly those presented at the large public meetings, do not lend themselves to being abstracted. Their value lies not in the bare bones of the ideas presented—ideas in economics are widely shared with the general population—but in the analysis and factual documentation by which the ideas are developed. Efforts to interest the economics profession in abstracts of articles have not had substantial success.

There are also administrative problems with respect to abstracting. Someone would need to do the work. Presumably the author would be required to abstract his own paper. Abstracting is a writing art and it does not follow that a person who can write a good paper can write a good abstract of it.

We think it would be appropriate when sessions or papers are not included in the papers and proceedings that either an abstract or other summary of the session might well be published in the papers and proceedings volume. Similar to the abstract, although likely to be longer, is the reporting of a panel discussion by a *rapporteur*. The round table conference on the market for economists held at the 1958 meetings drew a large body of participants and was successfully reported in this manner. For sessions in which there are informal presentations or panel discussions, this type of reporting may well prove to be the best solution to the problem of including them in the papers and proceedings volume.

Some of the sharpest criticisms have been directed at the discussions of papers. Discussants often do not discuss the paper but write short papers of their own. We think that the length of discussion papers published should be rigorously limited and that in case the discussant departed substantially from his assignment, the committee should feel free to drop his discussion entirely from the volume.

VII. *Summary and Conclusions*

On the basis of the previous discussion, we now wish to summarize our conclusions. We proceed on the assumption that the papers and proceedings volume is basically determined by the nature of the subject and by the program, and that the program will continue along present lines. Major changes in the nature of the American Economic Association programs would call for some rethinking of this whole problem.

Our conclusions may be summarized as follows:

1. The American Economic Association should continue to publish a volume of papers and proceedings not later than May of the year following the December meetings or after a comparable time interval in case the dates of the meetings were changed. The papers for at least the central core of the program should be included in this volume.
2. Papers and discussions presented at the sessions that are scheduled at the request of individuals and groups might be excluded from the volume. This decision should be made in advance by the program committee and made known to those participating in the sessions. Reference to these sessions should be made in the program as published in the volume. Experiments might be made in publishing short abstracts or summaries of these sessions. Panel discussions and informal sessions might well be summarized by a *rapporteur*.
3. The standard length of papers published should be the number of words that can be presented orally in the period of time allotted to the paper by the program committee. An appeal to the program committee should be provided for considering requests by authors and questions by the editor of the volume regarding the desirability of granting extended space in particular cases.
4. The majority of the Committee recommends that the papers and proceedings volume should continue to be part of the regular benefits which a member receives for his dues. Mr. Friedman favors charging separately for the volume.

ROY BLOUGH, *Chairman*
J. DOUGLAS BROWN
JOSEPH W. CONARD
WILLIAM J. FELLNER
MILTON FRIEDMAN

April 28, 1961

APPENDIX A

SUMMARY OF RESPONSES OF 38 ECONOMISTS* REGARDING THE PAPERS AND PROCEEDINGS VOLUME

1. Do you make use of the *Papers and Proceedings* volumes:

a) In your personal study and research?

Frequently	17
Occasionally	21
Vitually never	0

b) For teaching assignments to students?

Frequently	9
Occasionally	22
Virtually never	5
No answer	2

c) How do the *P. and P.* compare in the above respects with other papers such as those appearing in the *American Economic Review* and other professional economic journals?

Variable in quality	10
Lower in usefulness	12
No substantial difference	8
Higher in usefulness	12
No answer	3

2. Do you think the publication of the volume of *P. and P.*

a) Improves the quality of the papers presented?

Yes	34
No	2
No answer	2

b) Helps or hampers the program committee in meeting the needs of various groups of economists?

Helps	1
Hampers	2
No effect	27
No answer	8

3. What is your general opinion of the volume of *P. and P.*

Satisfied	12
Fairly well satisfied	20
Moderately dissatisfied	4
Very dissatisfied	1
No answer	1

4. If you are dissatisfied with the volume of *P. and P.*, in what direction does the remedy lie?

Improvement of the volume	22
Abandonment of volume	1
No answer (several previously expressed satisfaction with present volume)	15

* The responding economists included George H. Borts, Howard R. Bowen, George K. Brinegar, Martin Bronfenbrenner, E. Cary Brown, J. Keith Butters, Melvin G. de Chazeau, Gerhard Colm, Evsey D. Domar, Earl S. Garver, George Garvy, Marion H. Gillim, Leland Gordon, Harold M. Groves, Burton C. Hallowell, Walter W. Heller, Paul T. Homan, Calvin B. Hoover, J. E. Howell, John G. B. Hutchins, Clifford L. James, Walter Kramer, Theodore J. Kreps, Leland C. Lehman, Arthur D. Lynn, Jr., C. Ward Macy, Raymond F. Mikesell, J. Carter Murphy, Mabel Newcomer, William H. Nichols, Paul R. Olson, Kenyon E. Poole, Eli Shapiro, Sherman Shapiro, D. A. Snider, Earl R. Swanson, Willard L. Thorp, Unsigned.

5. If you think the volume should be improved, which of the following do you consider desirable?

Eliminating some of the papers	15
More drastic limits on lengths of papers	10
Publishing only abstracts of papers	7
No answer or no choice among these	16

6. If you think some selection should be made among papers, should this be done

By announcing in advance the sessions for which papers would be published	9
By having an editorial committee select the papers for publication	12
No answer or no choice between these	17

7. If your reaction is that the volume should be discontinued, what alternative or alternatives would you favor for dealing with the papers?

No special treatment	1
Expansion of *American Economic Review*	0
Priority for publication in *American Economic Review*	1
No answer or no choice expressed	36

8. If the financial situation of the Association became such that it was necessary either to increase income or cut costs, which would you prefer with regard to the cost of *P. and P.?*

Increase dues by the amount involved and distribute to all members	31
Charge separately for *P. and P.*	3
Eliminate *P. and P.*	3
No answer	1

REPORT OF THE CENSUS ADVISORY COMMITTEE

During 1961 the Census Advisory Committee of the American Economic Association met with the Director and Executive Staff of the Census Bureau in May and November. The principal topics discussed have been: the Census Bureau's long-range economic statistics program; the Census Bureau's report on "Business Cycle Developments"; statistical needs in relation to area redevelopment and economic growth programs; price-cost indexes; the desirability of a Census of Wealth; and the Census of Transportation.

SOLOMON FABRICANT, *Chairman*

REPORT OF REPRESENTATIVE TO THE AMERICAN COUNCIL OF LEARNED SOCIETIES

The most important "news" of the ACLS for 1961 is its receipt of foundation grants that will assure maintenance of its activities at the current level—an annual budget of at least $1,500,000—for the ensuing ten years. (This report properly relates to 1961, but because the Council's fiscal year ends in June and only half of the year is covered by its Annual Report, issued in December, it is necessary to anticipate to the extent of drawing on the President's Report for the second half, made available at the Annual Meeting in January, 1962, and for convenience to mention a few other items learned at the meeting.)

As in other years, the Council's activities have been of a miscellaneous character, hard to summarize intelligibly. Details are available in its published annual reports and/or in the monthly *News Letter*, sent gratis to a large mailing list and on request to anyone interested. In general, the effort is to meet urgent needs of humanistic scholarship and social science not otherwise provided for. Social science means primarily disciplines not represented on the Social Science Research Council but covers history and historical studies. The ACLS also is an organization of constituent professional societies, which are represented by delegates and by their secretaries, who have a partly separate organization. These now number thirty-one, including one finally approved at the January meeting. The ACLS and the SSRC collaborate in several fields—especially six area studies—and both have belonged to a Conference Board of Research Councils, including also those on the natural sciences and education.

Many activities involve relations with the federal government or its agencies and their relations to scholarly or scientific interests. During the past year the Council officers have been actively concerned over the imbalance in higher education to result from heavy governmental subsidizing of natural science and modern languages under the National Defense Education Act, to the neglect of other humanistic fields and of the social sciences. Efforts to get the scope of the Act extended have so far been unsuccessful. The Council has regularly contributed to sending American representatives to learned congresses abroad and to enabling foreigners to attend such in this country. It works closely with UNESCO and the American Commission, of which it is a member, and its President, Frederick Burkhardt, is Chairman of the Program Committee. It also works with several more or less permanent committees or bodies promoting intellectual interests.

The Council itself distinguishes between its Basic Program and Special Programs. Under the former, the major item is support of individual scholars through fellowships and grants-in-aid. Its fellowships enable a recipient to devote six months to a year to full-time research at the predoctoral level. In 1960-61, twenty-six fellows received amounts of from $3,000 to $7,000, averaging over $5,000. New funds enable an expansion of the program and establishment of fellowships for students who have finished work for the doctorate except final completion of the thesis, so that they need not take a position with heavy teaching or other work, postponing indefinitely taking the degree. Grants-in-aid support individual research projects, allowing certain travel expense, clerical assistance, and cost of producing materials. In 1960-61, ninety-seven grants ranged from 120 to $2,000, averaging just under $1,100, and for the following year the number has been increased and the average amount slightly raised. For the past five years, the Council has also awarded prizes, ten each year, of $10,000 each, for distinguished achievement in humanistic scholarship or social science. Three of these have been given to economists (including one awarded in 1961 but paid and announced in January, 1962) and others have gone to workers in other social sciences.

Two special activities of the year stressed by the Council are its dealings with the Academy of Sciences of the U.S.S.R. over exchange of lecturers and research scholars and the inauguration of a program of research and teaching in American Studies in European Universities, under a newly appointed Director. The Russian negotiations have been patience-trying in the matter of visas; the appointees who have managed to get to Russia have received cordial treatment and co-operation. No Russians have yet come to this country but some selections are said to have been made. Under the other program, an American professor is on duty in Paris and nearly twenty appointments have been arranged for in several countries.

The ACLS has been increasingly interested in secondary education, in the humanities, but especially of late in the social studies field. It commissioned nine qualified persons to write papers on objectives and curriculum content, which have been discussed in a meeting of the National Council for the Social Studies and after revision will form the substance of a book expected to be published in September. Under a grant from the Carnegie Corporation, it has also appointed Mr. Martin Mayer, author of a recent book, *The Schools*, to do a six-month survey of teaching in this field and make recommendations on how interested agencies can best proceed in future curriculum development. Another interest is effective language instruction, especially in the languages not usually taught in American institutions, and also in linguistic sciences.

Needed extensions of activity are being explored or funds sought for their undertaking. Funds are badly needed to subsidize scholarly publication of manuscripts of highly special appeal and limited interest or in length between a journal article and a book. Also, numerous learned journals are meeting difficulty in sustaining themselves financially and need assistance.

FRANK H. KNIGHT

REPORT OF REPRESENTATIVES TO THE SOCIAL SCIENCE RESEARCH COUNCIL

During 1961 the Social Science Research Council was concerned with a number of problems of particular relevance to the development and improvement of economic research.

The Committee on Agricultural Economics, under the chairmanship of Herman M. Southworth, continued to re-examine neglected areas of research in its field. Among the more important results was the publication in the August, 1961, issue of the *Journal of Farm Economics* of a committee memorandum, "Market Structure Analysis as an Orientation for Research in Agricultural Economics," by Robert L. Clodius and Willard F. Mueller. (As published, this memorandum also had appended to it annotated bibliographical materials, abstracts of recently completed research in the field, and a list of research projects currently under way, all prepared by a subcommittee of the North Central Regional Research Committee. The latter Committee also sponsored the distribution of a substantial number of reprints of the journal article to interested research workers in the field.) Early in the year, a subcommittee under the chairmanship of Harry C. Trelogan held a conference of librarians and agricultural economists to explore problems of retrieving and cataloguing agricultural economic research materials. Responsibility for further prosecution of this important project was turned over in June to a new committee of the American Farm Economic Association, with Dr. Trelogan as Chairman.

The Committee on Analysis of Economic Census Data, with John Perry Miller as Chairman, continued its important efforts to make the economic statistics gathered by the Bureau of the Census more useful to economists. The six Committee projects which I reported last year are continuing. Of these, the greatest progress has been made by Victor R. Fuchs whose monograph, *Changes in the Location of Manufacturing in the United States Since 1929*, will be published early in 1962 by the Yale University Press. In view of his new responsibilities in Washington, Carl Kaysen has enlisted the aid of Tom Wilson in the further development of the project on the industrial structure of large diversified manufacturing firms.

A new Committee on the Economy of China was created late in 1961. Its members are Simon Kuznets (Chairman), A. Doak Barnett, Abram Bergson, Walter Galenson (Research Director), and Joseph A. Kershaw. This Committee envisages the preparation and publication of a series of monographs on the Chinese economy during the next five years. Through its efforts, the Committee hopes to stimulate research and training, while more effectively mobilizing and co-ordinating the qualified research personnel, in this neglected area.

Under the chairmanship of Simon Kuznets, the Committee on Economic Growth continued to be very active. Two conferences were held during 1961, the first on the Economics of Soviet Industrialization in May and the second on the Economies of Sub-Saharan Africa in November. Conferences on demographic and economic trends in the developing countries and on the role of education in the early stages of economic development were also approved for late 1962. Papers and discussions of the 1960 conference on Natural Resources and Economic Growth (Joseph J. Spengler, Editor) were reproduced by offset during the year; those of the 1960 conference on Rate and Direction of Inventive Activity (Richard R. Nelson, Editor) are scheduled for publication in early 1962. The sixth in the series of essays summarizing Kuznets' comparative studies, "Quantitative Aspects of the Economic Growth of Nations: VI. Long-Term Trends in Capital Formation Proportions," was published as a supplement to *Economic Development and Cultural Change*, July, 1961. Publications resulting from the Committee's collaborative foreign studies included during 1961 Henry Rosovsky's volume, *Capital Formation in Japan, 1868-1940,* and two volumes published by L'Institut de Science Economique Appliquée on the quantitative history of the French economy, with J. Marczewski and J. C. Toutain as authors.

The Committee on Economic Stability (R. A. Gordon, Chairman) made rapid strides during 1961 in launching its first major project: the development of a large-scale disaggregated econometric model of the United States. This pathbreaking project, under the leadership of Lawrence R. Klein and James S. Duesenberry, has enlisted the assistance of seventeen specialists who by mid-1962 will have set forth appropriate mathematical relationships for each assigned area and, through a second summer seminar, will have produced a homogeneous, consistant, and unified model. During the autumn of 1962, the intention is to program all of the data and hypothesized equations for simultaneous estimation on a large computer. The Committee hopes that, when the system has been estimated and made public, it will be helpful both for forecasting and policy guidance. In addition to this major project—financed by a grant from the National Science Foundation—the Committee developed a program for stimulating a number of monographs on long- and short-run investment behavior in particular industries or sectors. Bert G. Hickman has agreed to serve as co-ordinator of these several studies, most of them doctoral dissertations, in order to assure that they will be carried out within a common approach and analytical framework.

Thanks to the support of the National Science Foundation, the Committee on Mathematics in Social Science Research will hold four summer institutes (two at Stanford and two at Princeton) in 1962. These institutes are intended to provide training for advanced graduate students and recent recipients of the Ph.D. in social sciences who intend to apply mathematical models in their research, and to provide the opportunity for conferences of established social scientists whose research is mathematically oriented. The projects of the Committee on Population Census Monographs and the Committee on Urbanization, referred to in my report of last year, are still under way. However, progress has been slowed because census tabulations have been completed more slowly than expected a year ago. This problem should have been largely resolved by mid-1962. Finally, an exploratory Committee on the Preservation and Use of Economic Data (Richard Ruggles, Chairman) considered

REPORT OF REPRESENTATIVE TO THE NATIONAL BUREAU OF ECONOMIC RESEARCH

During 1961 the National Bureau of Economic Research added fourteen titles to its lists of publications. Particularly noteworthy was the elaborate study of *Business Cycle Indicators,* of which Geoffrey H. Moore was editor, and *Capital in the American Economy: Its Formation and Financing,* by Simon Kuznets. Titles of new publications, reports in press and nearing completion are listed in the recently published Annual Report of the Bureau. Also described there are: new programs, such as the study begun in the field of education and the steps being taken to publish a large collection of basic data on the relationship of investment to the business cycle; reports of special research conferences, and certain collected papers published by the Bureau, the directors, officers, and staff; and the finances.

WILLARD L. THORP

REPORT OF REPRESENTATIVE TO THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

A meeting was organized by the American Economic Association, co-sponsored by Section K of the American Association for the Advancement of Science, at the annual meeting of the American Association for the Advancement of Science in Denver, Colorado, at 2:00 p.m., December 26, 1961, as follows:

The Economics of Knowledge and Information.
Leslie Fishman, University of Colorado, Presiding.

1. Knowledge as a Commodity. K. E. Boulding, University of Michigan.
2. The Productivity and Efficiency of Investment in Education. Fritz Machlup, Princeton University.
3. Information Input Overload; Features of Growth in Communications-Oriented Institutions. Richard L. Meier, University of Michigan.

KENNETH E. BOULDING

REPORT OF THE POLICY AND ADVISORY BOARD TO THE INSTITUTE OF INTERNATIONAL EDUCATION

The Fourth Session of the Economics Institute was held at the University of Colorado from June 30 to August 30, 1961. The Director of the Institute was Wyn S. Owen, of the University of Colorado. The instructional staff in economics included Irving Morrissett, Purdue University, Martin Bronfenbrenner, University of Minnesota, Fred Westfield, Northwestern University, and several junior instructors. These were supported by a specialized staff in the teaching of English as a foreign language, several visiting lecturers, as well as a counsellor staff and office personnel. The Institute again proved to be an extremely successful venture, providing intensive instruction in economic theory, mathematics, and English, adjusted to the varied levels of preparation of the students. A total of fifty-three students from twenty-six countries attended the Fourth Session and these students are now in residence at twenty-three American universities and colleges.

The program has benefited from the invaluable administrative assistance of the Institute of International Education.

The initial grant from the Ford Foundation for the program was designed to cover three sessions of the Economics Institute. As a result of the fact that several academic sponsors of attending students have contributed to the operational costs, the initial grant proved more than sufficient for four years. On the recommendation of the Board, the Ford Foundation has supplemented this balance with sufficient funds to finance a fifth session to be conducted. This session will be held at the University of Colorado from June 28 to August 29, 1962, again under the direction of Wyn S. Owen.

During the past year a special evaluation report on the program was prepared for the Ford Foundation by Professor Holland Hunter, of Haverford College. Professor Hunter concluded that the Institute had been successful in meeting its objectives of: (1) making graduate study in the United States more fruitful for foreign students in economics and agricultural economics; (2) reducing the financial sacrifice and emotional strain of academic failure for foreign students in economics and agricultural economics; (3) shortening the time needed by foreign students in economics and agricultural economics to attain a given level of proficiency; (4) benefiting U.S. graduate faculty and students by reducing the class and office time devoted to poorly prepared for-
ign students in economics and agricultural economics; and (5) serving as a
oject in the area of field of interest-centered orientation courses. Pro-
In his rep ecommended that the Ford Foundation's support of the pro-
conclusion. Both he ued.
complement the Institute's effort Institute the Director also strongly supported this
The Policy and Advisory Board has Hunter also drew attention to the need to
improved selecti [illegible] eign students.
carefully considered the subject of long-

range plans and recommends that the Executive Committee of the American Economic Association sponsor a further request for funds to finance a new program and to appoint a new Advisory Board which would supervise the operations of the Institute and look into the question of improving selection procedures for foreign graduate students coming to this country.

LORIE TARSHIS, *Acting Chairman*

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NOTICE

To MEMBERS and SUBSCRIBERS

INCREASE IN RATES

At the March 23-24, 1962, meeting of the Executive Committee of the Association, it was decided to adopt the following rate schedule, effective as of January 1, 1963:

Annual dues	$ 8.00
Family membership	1.00
Junior (student) membership	4.00
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Contributing membership	25.00 or more
Subscription to the *A. E. R.*	8.00

The members of the Executive Committee felt this action was necessary to enable the Association to continue present services to its members and to meet rising publishing costs of the *American Economic Review* and a new edition of the *Handbook*. It should be noted that membership dues and subscription rates have not been changed since 1950. The present schedule of rates is well below that of most other professional organizations.

HAROLD F. WILLIAMSON
Secretary